ASHLAND GOSPEL
TABERNACLE
S S LIBRARY

Digitized by the Internet Archive
in 2026

https://archive.org/details/newcabinetcyclop0000ains

THE NEW

CABINET CYCLOPÆDIA

AND

TREASURY OF KNOWLEDGE.

THE NEW

CABINET CYCLOPÆDIA

AND

TREASURY OF KNOWLEDGE.

A HANDY BOOK OF REFERENCE ON ALL SUBJECTS AND FOR ALL READERS.

THE ARTICLES RELATING TO AMERICA EDITED BY

AINSWORTH R. SPOFFORD, LATE LIBRARIAN OF CONGRESS,

AND EDITOR OF THE "LIBRARY OF CHOICE LITERATURE."

THE ARTICLES RELATING TO EUROPE EDITED BY

CHARLES ANNANDALE, M.A., LL.D.,

EDITOR OF THE "IMPERIAL DICTIONARY," ETC.

—THE WORK COMPRISES—

A CYCLOPÆDIA OF GENERAL KNOWLEDGE.
A DICTIONARY OF HISTORICAL EVENTS.
A COMPLETE ATLAS OF AUTHORIZED MAPS.
A LIBRARY OF BIOGRAPHY.
A GAZETTEER OF THE WORLD.

VOL. VI.

PHILADELPHIA:

THE GEBBIE PUBLISHING CO., LIMITED.

1899.

Copyright, 1899, by

THE GEBBIE PUBLISHING CO., Limited.

KEY TO THE PRONUNCIATION.

The pronunciation of the words that form the titles of the articles is indicated in two ways: 1st, By *re-writing* the word in a different form and according to a simple system of transliteration. 2d, By marking the syllable on which the chief *accent* falls. Entries which simply have their accentuation marked are English or foreign words that present little difficulty, and in regard to which readers can hardly go far wrong. A great many of the entries, however, cannot be treated in this way, but must have their pronunciation represented by a uniform series of symbols, so that it shall be unmistakable. In doing this the same letter or combination of letters is made use of to represent the same *sound*, no matter by what letter or letters the sound may be represented in the word whose pronunciation is shown. The key to the pronunciation by this means is greatly simplified, the reader having only to remember one character for each sound. Sounds and letters, it may be remarked, are often very different things. In the English language there are over forty sounds, while in the English alphabet there are only twenty-six letters to represent them. Our alphabet is, therefore, very far from being adequate to the duties required of it, and still more inadequate to represent the various sounds of foreign languages.

The most typical *vowel* sounds (including diphthongs) are as shown in the following list, which gives also the characters that are used in the Cyclopedia to show their pronunciation, most of these being distinguished by diacritical marks.

ā, as in f*a*te, or in b*a*re.
ä, as in *a*lms, Fr. â*m*e, Ger. B*a*hn=á of Indian names.
å, the same sound short or medium, as in Fr. b*a*l, Ger. M*a*nn.
a, as in f*a*t.
ạ, as in f*a*ll.
a, obscure, as in r*u*r*a*l, similar to *u* in b*u*t, ė in h*e*r: common in Indian names.
ē, as in m*e*=*i* in mach*i*ne.
e, as in m*e*t.
ė, as in h*e*r.
ī, as in p*i*ne, or as *ei* in Ger. m*ei*n.
i, as in p*i*n, also used for the short sound corresponding to ē, as in French and Italian words.
eu, a long sound as in Fr. je*û*ne, =Ger. long ö, as in Söhne, Göthe (Goethe).
eu, corresponding sound short or medium, as in Fr. p*eu*=Ger. ö short.
ō, as in n*o*te, m*oa*n.
o, as in n*o*t, soft—that is, short or medium.
ŏ, as in m*o*ve, t*wo*.
ū, as in t*u*be.
u, as in t*u*b: similar to ė and also to *a*.
u̇, as in b*u*ll.
ü, as in Sc. ab*u*ne=Fr. *û* as in d*û*, Ger. *ü* long as in gr*ü*n, B*ü*hne.
u̇, the corresponding short or medium sound, as in Fr. b*u*t, Ger. M*ü*ller.
oi, as in *oi*l.
ou, as in p*ou*nd; or as *au* in Ger. H*au*s.

Of the *consonants*, b, d, f, h, j, k, l, m, n, ng, p, sh, t, v, z, always have their common English sounds, when used to transliterate foreign words. The letter c is not used by itself in re-writing for pronunciation, s or k being respectively used instead. The only consonantal symbols, therefore, that require explanation are the following:—

ch is always as in r*ich*.
d, nearly as *th* in *th*is=Sp. *d* in M*a*drid, &c.
g is always hard, as in *go*.
h represents the guttural in Scotch lo*ch*, Ger. na*ch*, also other similar gutturals.
ṇ, Fr. nasal *n* as in bo*n*.
r represents both English *r*, and *r* in foreign words, which is generally much more strongly trilled.
s, always as in *so*.
th, as *th* in *th*in.
th, as *th* in *th*is.
w always consonantal, as in *we*.
x=ks, which are used instead.
y always consonantal, as in *y*ea (Fr. *ligne* would be re-written lēny).
zh, as *s* in plea*s*ure=Fr. *j*.

Mona, the ancient name of the island of Anglesea and the Isle of Man.

Mona (*Cercopithēcus mona*), a monkey, [illegible] called the *variegated monkey*, because its fur is varied with gray, red, brown, and green. It is often brought to Europe, and is easily tamed.

Monachism. See *Monastery* and *Orders* (*Religious*).

Mon'aco, a principality lying between the French department Alpes Maritimes (Nice) and the Mediterranean. In 1861 the Prince of Monaco sold the departments of Mentone and Roccabruna to France for 4,000,000 francs; and the principality has since then been confined to an area of about 8 square miles, with a pop. 1890, of 12,000. The prince (a scion of the house of Grimaldi) exercises both legislative and executive functions, while the people are exempt from taxation, as the revenue is almost entirely derived from the rents of the gaming establishment. The capital, Monaco (pop. 3292), situated on a rocky height projecting into the sea, is a renowned watering-place. About a mile to the E. is Monte Carlo, a collection of hotels and villas which have sprung up near the luxurious gardens of the handsome gambling casino, established here in 1860. This institution is now the property of a joint-stock company. The inhabitants of Monaco (*Monégasques*) are not admitted to the gaming-tables.

Monad, in philosophy, an imaginary entity in the philosophy of Leibnitz, according to whom monads are simple substances, of which the whole universe is composed, each differing from every other, but all agreeing in having no extension, but in being possessed of life, the source of all motion and activity. Every monad, according to Leibnitz, is a soul, and a human soul is only a monad of elevated rank.

Monad, the term applied to certain minute infusorial organisms of a low type of organization, consisting each of a little speck of protoplasmic matter furnished with a vibratile filament or *cilium*, and making their appearance in putrescent fluids.

Mon'aghan, a county of Ireland in Ulster; area 319,741 acres, of which a great part is arable. The surface is hilly, and abounds with small lakes and bogs. The deep soil is favourable to the culture of flax, and the other chief crops are oats and potatoes. Spade husbandry is much practised; the culture of green crops is increasing, and the linen manufacture is reviving. Monaghan is the county town. The manufacture of linen is the chief employment. The county returns two members to parliament. Pop. 86,089.—The town of Monaghan is 70 miles N.N.W. Dublin, on the Ulster Canal. It has a spacious market-place, a handsome courthouse, jail, infirmary, cavalry barracks, &c. Pop. 3369.

Monarchy is a state or government in which the supreme power is either actually or nominally vested for life in a single person, by whatsoever name he may be distinguished. A monarchy in which the subjects have no right or powers as against the monarch (*e.g.* Persia) is termed *despotic* or *absolute;* when the legislative power is wholly in the hands of a monarch, who, however, is himself subject to the law (*e.g.* Russia), it is termed *autocratic;* but when the monarch shares the power of enacting laws with representatives of the people, the monarchy is *limited* or *constitutional* (*e.g.* Great Britain). In ancient Greece, a monarchy in which the ruler either obtained or administered his power in violation of the constitution was termed a *tyranny*, however beneficent and mild the rule might be. Monarchies are either *hereditary*, as in Great Britain, or *elective*, as was formerly the case in Poland.

Monastery, a house into which persons retire from the world to lead a life devoted to religion. The practice of monachism or monastic seclusion, though it has been carried to its greatest development within the Christian Church, had its origin in periods long anterior to the Christian era, and has long flourished in countries where Christianity has little or no influence, as among the Brahmans and Buddhists. Christianity was probably not without its ascetics even from the first, but it was not until the close of the 3d century, when the Neo-Platonic and Gnostic doctrines of the antagonism between body and soul had gained strength, that solitary life began to be specially esteemed. The foundation of the first Christian monasteries is ascribed to Anthony the Great, who about 305, in the deserts of Upper Egypt, collected a number of hermits, who performed their devotional exercises in common. His disciple Pachomius, in the middle of the 4th century, built a number of houses not far from each other, upon the island of Tabenna, in the Nile, each of which was occupied by three monks (*syncelli*) in cells, who were all under the superintendence of a prior. These priors formed together the *cœnobium*, or monastery, which was under the care of the abbot, hegumenos or mandrite, and were obliged to submit to uniform rules of life. At the death of Pachomius, after 348, the monastic colony at Tabenna amounted to 7000 persons. His *rule* or monastic system continued to spread rapidly, reaching even Italy, where it was introduced by Athanasius, and thence extending to other western lands, until it was there superseded by the rule of St. Benedict. In the East it finally gave way to the rule of St. Basil, founded about 375.

Under the Pachomian rule there was not anything more than a tacit renunciation of the world. St. Basil imposed a stricter discipline upon the monasteries that embraced his rule; but Western monasticism, which rapidly spread during the 5th century, was accompanied by many irregularities, until monastic vows were introduced in the 6th century by St. Benedict. The monasteries of the West now became the dwellings of piety, industry, and temperance, and the refuge of learning. Missionaries were sent out from them; deserts and solitudes were made habitable by industrious monks; and in promoting the progress of agriculture and converting the German and Slavonic nations, they certainly rendered great services to the world from the 6th century to the 9th. Another incalculable benefit conferred upon civilization by the monasteries is the preservation of nearly the whole of the classic and mediæval MS. literature that we possess.

But monasteries changed their character, to a great degree, as their wealth and influence increased. Idleness and luxury crept within their walls, together with all the vices of the world, and their decay became inevitable, when, by a custom first introduced by the Frankish kings, and afterwards imitated by other princes, they came under the care of lay abbots or superiors, who, thinking only of their revenues, did nothing to maintain discipline among the monks and nuns. These being left wholly to their own government by the bishops, originally their overseers, soon lost their monastic zeal. A few only, by means of the convent schools (founded by Charlemagne for the education of the clergy), as, for instance, those at Tours, Lyons, Rheims, Cologne, Trèves, Fulda, &c., maintained their character for usefulness till the 9th and 10th centuries. The monastery at Cluny, in Burgundy, first led the way to reform. This was founded in the year 910, under Berno, was governed by the rules of St. Benedict, with additional regulations of a still more rigid character; and attained the position, next to Rome, of the most important religious centre in the world. Many monasteries in France, Spain, Italy, and Germany were reformed on this model, and the Benedictine rule now first became prominent in Britain through the instrumentality of Dunstan. The Celtic and other monasteries of Britain and Ireland heretofore seem to have had an independent historical connection with the early monachism of Egypt. The reforming spirit also gave birth to so many new orders or modifications of the Benedictine rule (such as the Carthusians and Cistercians), that in 1215 the Lateran Council forbade the formation of any new order. The prohibition, however, was not obeyed. The three great military orders (Templars, Hospitallers, and Teutonic Knights) were founded in the 12th century; while the famous mendicant orders of the Franciscans and Dominicans date from the 13th. With the reputation of renewed sanctity the monasteries acquired new influence and new possessions. Many of them ('exempt monasteries') released themselves from all superintending authority except that of the pope, and acquired

great wealth in the time of the Crusades from the estates of Crusaders and others placed under the protection of their privilege of inviolability, or even left to them in reversion. But with this growing influence the zeal for reformation abated; new abuses sprang up, and the character of each monastery came, at last, to depend chiefly upon that of its abbot.

The number of monasteries was much diminished at the time of the Reformation, when the rich estates of those in Protestant states were in part appropriated by the sovereign to his own use, in part distributed to nobles and ecclesiastics, and in part devoted to educational and benevolent purposes. In Catholic countries this period was marked by a revival of the spirit of monastic reform; while many new orders were founded whose objects were more directly practical (teaching, tending the sick, visiting the poor) than those of the older and more contemplative orders. Monachism, however, as belonging to the older system of things, was regarded with hostility by the spirit of rationalism and liberalism which found decisive expression in the French Revolution; and during the 18th century the monastic orders were obliged, as the papal power diminished, to submit to many restrictions imposed upon them by Catholic princes, or to purchase immunity at a high price. In 1781 the houses of some orders were wholly abolished by the Emperor Joseph II., and those suffered to remain were limited to a certain number of inmates, and cut off from all connection with any foreign authority. In France the abolition of all orders and monasteries was decreed in 1789, and the example was followed by all the states incorporated with France under the protection of Napoleon I. In the 19th century, however, under Napoleon III. and during the early years of the republic, monachism prospered in France, though since 1880 only monasteries authorized by the state are permitted to exist. In Germany all orders except those engaged in tending the sick were abolished in 1875. The unification of Italy was followed by a series of decrees pronouncing all monastic orders illegal. In Portugal monasteries were abolished by decree in 1834, and in Spain in 1837. In Russia the number of such institutions is strictly limited by law. In the R. Cath. states of South America the same policy of abolition has been adopted; whereas in the United States and Canada several orders have made considerable progress. Protestantism has never favoured monachism as found in the Roman Church, but in the Episcopal churches of England and America 'sisterhoods' and 'brotherhoods' (especially the former) have been formed at various times, generally with some philanthropic or charitable object. In the Eastern or Greek Church all nuns and the great majority of monks belong to the Basilian order. Some monasteries, including the famous monastery of Mount Sinai, obey the rule of St. Anthony. Monastic institutions for women, usually spoken of as convents or nunneries, date in their earliest form from about the middle of the 3d century. (See *Nun.*) For the monastic vows see the next article; for further information, see *Orders* (*Religious*), *Abbey*, &c.

Monastic Vows are three in number: poverty, chastity, and obedience. The vow of poverty prevents the monks from holding any property individually. Monasteries, however, professing merely the 'high' degree of poverty may possess real estate, yet not more than enough for their support, as the Carmellites and Augustines. In the 'higher' degree a monastery may hold only personal property, as books, dresses, supplies of food and drink, rents, &c., as the Dominicans. The 'highest' degree absolutely forbids both real and personal property, as is the case with the Franciscans, and especially the Capuchins. The vow of chastity requires an entire abstinence from familiar intercourse with the other sex; and that of obedience entire compliance with the rules of the order and the commands of the superior.

Monas'tir, or BITOLIA, a city of European Turkey, 100 miles N.W. of Saloniki. Being the central military station of Macedonia, and carrying on a large trade with Constantinople, Saloniki, Vienna, and Trieste, Monastir is a place of remarkable bustle. Pop. about 25,000.

Monboddo, LORD. See *Burnett, James.*

Moncontour (mon-kon-tör), a village of France, in Vienne, about 25 miles north-west of Poitiers. Pop. 720.

Moncton, New Brunswick, Canada, on the Canadian Pacific R. R. Pop. 1891, 8765.

Monday (that is, *moon-day;* Anglo-Saxon, *Monandæg;* German, *Montag*), the second day of our week, formerly sacred to the moon.

Mondoñedo (mon-don-yā'dō), a cathedral city near the north-west corner of Spain, prov. Lugo. Pop. 10,112.

Mondovì', a town in N. Italy, province of Cuneo, 53 miles west of Genoa. It is walled and defended by a dilapidated citadel. It has a fine cathedral. Pop. 8738.

Money, in its ordinary sense, is equivalent to pieces of metal, especially gold and silver, duly stamped and issued by the government of a country to serve as a legalized standard of value. In this sense it is more precisely designated *metallic* money to distinguish it from *paper* money, from which latter it is also distinguished by having an intrinsic value. A few particulars regarding money may here be given as supplementary to information contained in the articles *Currency*, *Coining*, *Bank*, &c. The sovereign and half-sovereign are the legal metal standard of value in the United Kingdom and most of the colonies. By the Latin Monetary Convention, which includes France, Belgium, Italy, Switzerland, and Greece, it has been agreed that the gold napoleon and the silver five-franc piece—or corresponding pieces—are to be exchangeable throughout these countries as their standard money; while by the Scandinavian Monetary Convention, which includes Norway, Sweden, and Denmark, the gold 20-kroner and 10-kroner pieces are the standard coins. These contracting states have thus agreed to issue no gold or silver coins except of a certain weight, fineness, and diameter. In Germany the 5-mark, 10-mark, and 20-mark pieces, and in the United States the gold dollar, are the standard units; while in Austria the silver florin, and in Russia the silver rouble, are the recognized standard coins. *Moneys of account* are those denominations of money in which accounts are kept, and which may or may not have a coin of corresponding value in circulation. In England the pound sterling may be said to be purely a money of account, although there is a coin, the sovereign, of corresponding value. The money unit in various countries is as follows:—England, the pound sterling; Belgium, France, and Switzerland, the franc; Germany, the mark; Austria-Hungary, the florin; Russia, the rouble; Italy, the lira; Spain, the peseta; Sweden, Norway, and Denmark, the krona; Holland, the guilder; Portugal, the milreis; Greece, the drachma; Turkey, the piastre; United States, the dollar; Brazil, the milreis; India, the rupee; China, the liang or tael; Japan, the yen.

Monge (monzh), GASPARD, a French mathematician and natural philosopher, born in 1746, died 1818.

Monghyr, or MONGHIR (mon-gēr'), a district and town of India, in Bengal. The district, which has an area of 3921 sq. miles, is intersected from east to west by the Ganges. The town stands on the Ganges, 80 miles east of Patna. It is of considerable antiquity, and has a fort which now contains the public buildings and the bungalows of the European residents. Monghyr, owing to the salubrity of its climate, is a favourite residence of invalided military men and their families. Pop. 1891, 57,077; of the district, 1,969,774.

Mongolia, a vast region of the north-east of Asia, belonging to the Chinese Empire, is situated between China Proper and Asiatic Russia; estimated area, 1,400,000 sq. miles. A great part of it is occupied by the Desert of Gobi or Shamo, and on or near its borders are lofty mountain chains, the principal of which are the Altai, the Sayansk, the Khinghan, and the Inshan. The inhabitants (estimated at 2,000,000) lead a nomadic life. They possess large herds of cattle, sheep, and horses. The climate is intensely hot in summer and bitterly cold in winter.

Mongols, a race of people in the north-east of Asia, whose original seat seems to have been in the north of the present Mongolia, and in Siberia to the south-east of Lake Baikal. Their first great advance was due to Genghis Khan, who having been, originally, merely the chief of a single Mongol horde, compelled the other hordes to submit to his power, and then, in 1206, conceived the bold plan of conquering the whole earth. (See *Genghis Khan.*) After the death of Genghis Khan, in 1227, his sons and grandsons pursued his conquests, subjugated all China, subverted the caliphate of Bagdâd (1263), and made the Seljuk sultans of Iconium tributary. In 1237 a Mongol army invaded Russia, devastated the country with the most horrible cruelty, and from Russia passed, in two divisions, into Poland and Hungary. At Pesth the Hungarian army was routed with terrible slaughter, and at Liegnitz, in Silesia, Henry, duke of Breslau, was defeated in a bloody battle, April 9, 1241. The Mongols were recalled, however, from their victorious career by the news of the death of Ogdai, in December 1241, the immediate successor of Genghis Khan. The empire of the Mongols was at the summit of its power during the reigns of Mangu Khan (1251–59) and Khubilai or Kûblai Khan (1259–94), the patron of Marco Polo. At that time it

extended from the Chinese Sea and from India far into the interior of Siberia, and to the frontiers of Poland. The principal seat of the *khakan* or great khan was transferred by Khubilai from Karakorum to China; the other countries were governed by subordinate khans, all of whom were descended from Genghis, and several of whom succeeded in making themselves independent. This division of the empire was the cause of the gradual decay of the power and consequence of the Mongols in the 14th century. The adoption of new religions (Buddhism in the east and Mohammedism in the west) also contributed to their fall. In 1368 the empire of the Mongols in China was overturned by a revolution which set the native Ming dynasty on the throne. Driven northwards to their original home, the eastern Mongols remained for a time subject to the descendants of Genghis Khan, but gradually splitting up into small independent tribes they finally were subdued and absorbed by the Manchu conquerors of China. Of the western Mongols the most powerful were the Kipchaks or Golden Horde, who lived on the Volga, and the khanate founded in Bokhara, on the Oxus, by Jagatai, the eldest son of Genghis Khan. The former gradually fell under the power of the Russians; but among the latter there appeared a second formidable warrior, Timurlenk (Tamerlane), called also Timur Beg. In 1369 he chose the city of Samarcand for the seat of his new government. The other Mongol tribes, with Persia, Central Asia, and Hindustan, were successively subjugated by him. In 1402, at Ancyra (Angora), in Asia Minor, he defeated and captured the Sultan Bajazet I., who had been hitherto victorious against the Christians in Europe, and before whom Constantinople trembled. After Timur's death, in 1405, his empire barely held together until 1468, when it was again divided. Baber (Babur), a descendant of Timur, founded in India, in 1519, the empire of the Great Mogul, which existed in name till 1857, though its power ended in 1739. (See *India*.) After the commencement of the 16th century the Mongols lost all importance in the history of the world, became split up into a number of separate khanates and tribes, and fell under the power of the neighbouring peoples. Their name still lingers in the Chinese province of Mongolia (see above), but Mongolian tribes are found far beyond its boundaries.

The term Mongolians or Mongolidæ is to some extent used by anthropologists to signify a very large division of the races of men, of which the Mongols proper were considered typical. This use of the name, which includes Tartars, Turks, Finns, Chinese, and Japanese, is to be carefully distinguished from the historical use.

Mongoose. See *Mungoose*.

Mon'ica, St., mother of St. Augustine, was born in Africa, of Christian parents, in 332. The grief of her life was the worldliness and long heresy of her great son; but she was miraculously assured by a dream of his conversion, and was informed by an aged bishop that 'the child of so many tears could not be lost.' With her other son, Navigius, she followed Augustine to Italy, where she died 4th May, 387, at Ostia. Her festival is 4th May.

Monier-Williams, Sir Monier, orientalist, born at Bombay 1819, where his father, Col. Monier-Williams, held the post of surveyor-general. He was educated at King's College, London, and Baliol and University Colleges, Oxford. He was professor of Sanskrit at Haileybury from 1844 to 1858, and in 1860 became Boden Sanskrit professor at Oxford. He is a fellow of Balliol, and holds the honorary degrees of D.C.L. and LL.D.; is the author of a Sanskrit grammar, a Sanskrit dictionary, Hinduism, Modern India, Religious Thought and Life in India, &c. He has travelled extensively in India, and was knighted in 1886.

Moniteur (mon-i-t*eur*) **Universel,** Le, a French daily newspaper, first published at Paris on 24th Nov. 1789. In 1800 it was declared an official paper, and retained that character until it was dispossessed on January 1, 1869, by the Journal Officiel.

Monitor, the type of a family of lizards (Varanidæ). They are the largest of the Lizard order, some species, such as the *Varanus Niloticus* of the Nile and Egypt, attaining a length of 6 feet. They generally inhabit the neighbourhood of rivers and lakes, and feed upon the eggs of crocodiles, turtles, and those of aquatic birds. The name is owing to the belief formerly entertained that these lizards gave warning of the approach of crocodiles.

Monitor, the popular name for a class of very shallow, heavily-armed iron-clad steam-vessels, invented by Ericsson, carrying on their open decks either one or two revolving turrets, each containing one or more enormous guns, and designed to combine the

maximum of gun-power with the minimum of exposure. Monitors are so called from the name of the first vessel of the kind, built during the American civil war, which proved its superiority in a famous engagement with the *Merrimac* in 1862.

Monk, a man who retires from the world to live in a monastery as member of some religious order. Originally all monks were laymen, but after about the 8th century the superiors, and by degrees other members, were admitted to holy orders. See *Monastery* and *Orders* (*Religious*).

Monk, GEORGE, Duke of Albemarle, an English general, famous for the prominent part he took in the restoration of Charles II., was born in 1608. At the age of seven-

General Monk.

teen he volunteered as a private soldier in the expedition to Cadiz. In 1628 he served at the island of Rhé, and from 1629 till 1638 in the Netherlands, where his soldierly qualities gained him a captaincy. As lieutenant-colonel he next took part in the expedition against the Scots in 1639, and when the rebellion broke out in Ireland in 1641 he was sent thither as colonel of Lord Leicester's troops. In the struggle betwixt Charles I. and the parliament Monk at first joined the royalists; but in Jan. 1644 he was taken prisoner at the siege of Nantwich, and after a short delay he was committed to the Tower. After the capture of the king Monk took the Covenant and regained his liberty, in 1646. Under the parliament he served in Ireland, and subsequently with Cromwell in Scotland, and in 1650 he reduced that country to obedience within a few weeks. In 1653 he assisted Admiral Dean in inflicting two severe naval defeats on the Dutch under Van Tromp the elder. Next year he was placed at the head of the English army in Scotland, and he was still in this position at the death of the Protector and at the resignation of his son in 1659. Monk had always been regarded with hope by the royalist party, and he seems to have decided at once upon the restoration, although he used all his unusually great powers of dissimulation, and even of deceit, to avoid committing himself either one way or the other until he was tolerably sure of success. The coming over of Charles II. was arranged with Monk, and the king rewarded his restorer with the dukedom of Albemarle, the order of the Garter, and with a pension of £7000 a year. Monk now fell into comparative obscurity. In 1666, however, he once more served against the Dutch at sea, defeating Van Tromp the younger and De Ruyter. He died in 1670, and was buried in Westminster Abbey.

Monkey-bread. See *Baobab*.

Monkey-cup, a name applied to the pitcher-plants.

Monkey-pot, the name given to the fruit of *Lecythis ollaria*, a large Brazilian forest tree. It consists of a hard capsule furnished with a lid, and containing seeds of which monkeys are fond.

Monkeys, the popular name applied sometimes to the whole of the great mammalian order Quadrumana, sometimes limited to those of the order that have tails, and generally cheek-pouches, to the exclusion of the apes, baboons, and lemurs. The general characters of the quadrumanous mammals are found in the great toe being opposable to the other digits of the foot, so that the feet become converted into 'hands.' The hallux or thumb may be absent, but when developed it is generally opposable to the other fingers; and the animals thus come to possess 'four hands,' or are 'quadrumanous.' The monkeys may all be divided into a lower and a higher section. The higher section is that of the *Catarhina* (Greek, *kata*, downwards, and *rhines*, nostrils) or Old World monkeys. The catarhine monkeys are distinguished by their obliquely-set nostrils, the nasal apertures being placed close together, and the nasal septum being narrow. Opposable thumbs and great toes exist in nearly all. The tail may be rudimentary or wanting, but in no case is it prehensile. Cheek-pouches, which are used as receptacle for food preparatory to its mastication, are

present in many; and the skin covering the prominences of the buttocks is frequently destitute of hair, becomes hardened, and thus constitutes the so-called *natal callosities*. The catarhine monkeys inhabit Asia and Africa. They include the anthropoid or man-like apes; the gibbons; the orang, the chimpanzee and the gorilla, the baboons and mandrills, the sacred monkey of the Hindus, the proboscis monkey, the Diana monkey, the mona, the wanderoo, &c. The lower section of monkeys consists of the *Platyrhina* (Greek, *platys*, broad; *rhines*, nostrils), or New World monkeys, which are entirely confined to South America. They have the nostrils widely separated, the septum or partition between being broad, hence the name. Another peculiarity consists in their prehensile tails; and there are none of the cheek-pouches or hard callosities on the rump so characteristic of Old World monkeys. The diet is especially of a vegetable nature. This section includes the marmosets, the spider-monkeys, the capuchin monkeys, the squirrel-monkeys, the howling monkeys, &c. See *Apes*, *Baboons*, &c.

Monk-fish. See *Angel-fish.*

Monk-seal. See *Seal.*

Monk's-hood. See *Aconite.*

Monmouth (Welsh, *Mynwy*), a parliamentary and municipal borough of England, county town of Monmouthshire, is situated in a beautiful valley at the confluence of the Monnow and Wye. The Monnow is here spanned by an ancient stone bridge, and the Wye by a modern one. Monmouth has malleable iron and tin-plate works, paper and corn mills, &c. The castle, of which only fragments remain, was a favourite residence of John of Gaunt, and the birthplace of Henry V. Monmouth, with Newport and Usk, sends a member to parliament. Pop. 6111.—The county is bounded by the counties of Hereford, Gloucester, Brecknock, and Glamorgan, and the estuary of the Severn; area, 370,350 acres. A considerable portion of the surface is mountainous and rocky, the remainder consisting of fertile valleys and gentle slopes. The chief rivers are the Wye, the Monnow, the Usk, the Ebbw, and the Rhymney. The production of coal and iron is extensive. Pontypool, Blaenavon, Tredegar, Ebbw Vale, and Rhymney are the head-quarters of the coal and iron industries. The manufacture of tin-plate is also extensively carried on. Among the antiquities of the county are remains of Llanthony and Tintern Abbeys, and the fine Norman castle of Chepstow. Monmouth returns three members to parliament. Pop. 1891, 252,260.

Monmouth, James, Duke of, the natural son of Lucy Walters, one of the mistresses of Charles II., was born at Rotterdam in 1649, and was always acknowledged by Charles as his natural son, though there were doubts of his paternity. After the Restoration he was created Duke of Orkney and Duke of Monmouth (1663), married the daughter and heiress of the Earl of Buccleuch, and received the Garter. His handsome person, affable address, and distinguished valour obtained him much popularity, but his education was defective, and his capacity mean. It was reported that the king had been privately married to Lucy Walters, and the popular dislike of the Duke of York, afterwards James II., joined with the fact of Monmouth being a Protestant, gave occasion to hopes that her son might succeed to the crown, though the king expressly declared that the Duke of Monmouth had no claims to legitimacy. In 1679 Monmouth was intrusted with a command in Scotland, and defeated the Covenanters at the battle of Bothwell Bridge, 22d June, but was soon afterwards sent beyond seas at the instigation of his uncle. A few months afterwards he returned without leave, and became the centre of the popular movement in which the lives of Lord William Russell and Algernon Sidney were sacrificed. The result to Monmouth was his exile in Holland. On the accession of James II. he was induced to attempt an invasion of England. He arrived at Lyme Regis with less than a hundred followers (June 11, 1685); but his numbers were soon increased. He proclaimed James the poisoner of the late king, and asserted the legitimacy of his own birth; but from the first there was no likelihood of his success. His small body of undisciplined troops were totally defeated at Sedgmoor, and the duke himself was captured and beheaded 15th July, 1685, after abject appeals to the king for mercy.

Monmouth, Warren co., Ill., has important manufactories of ploughs, files, furniture, &c. Pop. 1890, 5936.

Mon'ochord, a musical instrument with one string, much employed by the ancients in the musical training of the voice and ear. The string, stretched over a board or sounding-box, emits a musical note on being caused

to vibrate. The length of the vibrating part of the string may be altered at will by means of a movable bridge, and the relative pitch of the different notes thus produced compared. A modified, or rather developed, form of the instrument is employed to exhibit the law of vibrating strings, and also to illustrate the relations of harmonics and the fundamental ideas of undulations.

Mon'ochrome, a painting executed in a single colour. This description of art is very ancient, and was known to the Etruscans. The most numerous examples existing of this kind of painting are on terra cotta. A painting, to be a proper monochrome, must have the figures relieved by light and shade.

Monocotyle'donous Plants, plants with only one cotyledon. See *Endogenous Plants, Botany.*

Monodel'phia, one of the three sub-classes into which mammals were divided by De Blainville in 1816 in accordance with the nature of their reproductive organs, the other two classes being Ornithodelphia and Didelphia. The Monodelphia are characterized by the fact that the uterus or womb is single, and shows a single uterine cavity. This sub-class corresponds with the 'Placental' mammals, and includes all the Mammalia except the monotremes and marsupials.

Monœ'cious, in botany, having male flowers and female flowers on the same individual plant; opposed to *diœcious.*

Mon'ogram, a character or cipher composed of one, two, or more letters interwoven, and used as a sign or abbrevation of a name or word. The use of monograms was common among the Greeks and Romans, and the art of combining and contorting letters and words flourished universally in the middle ages. The term is now applied to conjoined initials of a personal name on seals, trinkets, letter-paper and envelopes, &c., or employed by printers, painters, engravers, &c., as a means of distinguishing their work.

Mon'olith, a pillar, statue, or other large object cut from a single block of stone.

Monoma'nia, the name given by some physicians to that form of mania in which the mind of the patient is absorbed by one morbid idea or impulse, and the person seems to be insane only in one direction. Dipsomania and kleptomania are regarded as two varieties of monomania.

Monomet'allism, the principle of having only one metallic standard in the coinage of a country; opposed to *bimetallism.*

Monongahe'la, a river of the United States, formed by the union of West Fork and Tygart's Valley River in West Virginia, runs north into Pennsylvania, and unites with the Alleghany, at Pittsburg, to form the Ohio. It is navigable for large boats 60 miles, and for small boats 200 miles from its mouth. Its length to the source of the Tygart's Valley River is 300 miles.

Monopet'alous, in botany, having the petals united together into one piece by their edges; otherwise called *gamopetalous.*

Monoph'ysites, those who maintained that there was but one nature in the incarnate Christ, that is, that the divine and human natures were so united as to form but one *nature*, yet without any change, confusion, or mixture of the two natures. They were condemned as heretics by the Council of Chalcedon in 451. The Eastern and Egyptian clergy were inclined to the Monophysite doctrine, while the Western church contended for the decree of the council. After long and often bloody contests, the orthodox church succeeded in overawing the heresy in the first half of the 6th century. In Egypt, Syria, and Mesopotamia the Monophysite congregations, however, remained the strongest, had patriarchs at Alexandria and Antioch, existing, without interruption, by the side of the imperial orthodox patriarchs; and after Jacob Baradæus, had, about 570, established their religious constitution, formed the independent churches of the Jacobites and Armenians, which have maintained themselves ever since. The Coptic Christians of Egypt and the Abyssinian church are also Monophysites in doctrine.

Monop'oli, a seaport of South Italy, on the Adriatic, in the province and 25 miles E.S.E. of Bari. It has a cathedral, manufactures of woollen and cotton cloth, and a trade in wine and olives. It is the residence of an archbishop. Pop. 20,918.

Monop'oly is an exclusive right, conferred by authority on one or more persons, to carry on some branch of trade or manufacture. The monopolies most frequently granted were the right of trading to certain foreign countries, of importing or exporting certain articles, or of exercising particular arts or trades. The entire trade and industry of the middle ages was characterized by attempts to erect and maintain monopolies, as evidenced by the trade-guilds and such associations as the Hanseatic League. The discovery of the New World only pro-

vided a fresh sphere for the same system; for not only did every government endeavour to monopolize the trade of its colonies, but in nearly every case the new countries were opened up by privileged 'adventurers' and jealous monopoly companies. The granting of monopolies has at all times been opposed to the spirit of English common law, but the practice was very common previous to the accession of the Stuarts. The abuse reached its height under Elizabeth. Notwithstanding the reluctance of the crown to surrender what was considered one of its most valuable prerogatives, the Statute of Monopolies (21 James I. cap. iii.) was passed in 1623, abolishing all licenses, monopolies, &c., with some exceptions. This act, which lifted an immense incubus from the industrial prosperity of the realm, is (with amendments) still in force; and its excepting clauses are the basis of the present laws as to patents, copyrights, &c. Both in Great Britain and other countries there are certain so-called government monopolies maintained on various grounds of public policy. Examples of such monopolies are the postal and telegraph service, the tobacco monopoly in France, the opium monopoly in India, &c. There are also numerous quasi-monopolies, such as those enjoyed by railway, water, and gas companies, and similar semi-public organizations.

Monosepalous, in botany, having the sepals united together into one piece by their edges; otherwise called *gamosepalous.*

Mon'otheism, the belief in, and worship of, a single, personal God; opposed to polytheism and distinct also from pantheism. It was at one time the received opinion that monotheism was the primeval intuitive form of religion, but most recent authorities now hold that it was everywhere posterior to polytheism, whence it was evolved by a gradual education. *Henotheism,* which Max Müller and Schelling maintain to be the primeval form, is merely the rudimentary phase of polytheism in minds not yet conscious of the complexity of the problems for which polytheism is suggested as the solution by more developed intellects. The three great modern monotheistic religions are Judaism, Christianity, and Mohammedanism. The Jewish prophets had a firm persuasion of one God, the Father and Judge of all; but they are continually upbraiding the people for lapsing into polytheism. After the Babylonish captivity the people became fixed in their belief. Christian monotheism is, of course, historically a development of Hebrew monotheism; and Mahomet probably borrowed the doctrine from the same source. Both Jew and Mohammedan regard the Trinitarian conception of Deity as a deviation from the pure doctrine of monotheism.

Monoth'elites, a sect of heretics who maintained that Christ had but *one will* (Gr. *monos,* single, *thelein,* to will). Their doctrine was the logical extension of the heresy of the Monophysites, who were all Monothelites. The sect rose into prominence in the 7th century, but a synod of the Lateran formally adopted the opposite doctrine of dyothelism, which has since been the orthodox doctrine in both the Western and the Eastern churches. The heresy, which at one time caused a great commotion in the church, gradually became extinct except in the Monophysite churches.

Monotre'mata, the lowest sub-class of Mammalia, corresponding to the *Ornithodelphia* of De Blainville, having only one common cloacal outlet for the fæces and the products of the urino-genital organs, in this respect as well as others, noticeably in producing eggs, resembling birds. The jaws have no teeth, at most having horny plates which serve the same purpose. There are no external ears. This sub-class includes but two genera, *Ornithorhynchus* and *Echidna.* The former has but one species, the *Ornithorhynchus paradoxus,* or duck-billed water-mole of Australia; the latter genus includes two species, the *Echidna hystrix,* or porcupine ant-eater of Australia, and the *E. setosa* of the same country. See *Ornithorhynchus* and *Echidna.*

Monreale (mon-re-ä'lā), or MORREALE, a town in Sicily, in the province and 5 miles W.S.W. of Palermo. It originally sprang up around the magnificent cathedral and Benedictine convent founded here in the beginning of the 12th century by the Norman Prince William II. The cathedral is specially famous for the gorgeous glass-mosaics which cover about 80,000 square feet of the interior. Monreale is the see of an archbishop. Pop. 14,031.

Monro', ALEXANDER, distinguished as 'Primus' or first, anatomist and founder of the Edinburgh Medical School, was born in London 1697, died 1767; studied in Edinburgh, afterwards in London under Cheselden, in Paris under Bouquet, and at Leyden under Boerhaave. After his return in 1719 he became demonstrator in ana-

tomy and surgery in Edinburgh University, and in 1725 obtained the chair of anatomy and surgery. He took an active part in promoting the erection of Edinburgh Infirmary, and in establishing a connection between it and the medical faculty of the university. His principal works are Osteology, a Treatise on the Anatomy of the Human Bones and Nerves; and an Essay on Comparative Anatomy (1733–47).—His son (1733–1817), ('Secundus') succeeded to his chair in 1759. ALEXANDER MONRO ('Tertius') succeeded his father in 1808.

Monroe, Monroe co., Mich., 2 m. from Lake Erie, is a well-built city, with handsome residences, extensive nurseries and various manufactories. Pop. 1890, 5258.

Monroe (mon-rō'), JAMES, fifth president of the United States of America, was born in 1758 in Westmoreland county, Virginia; died at New York in 1831. He was educated at William and Mary College, and from 1776 till 1778 served in the revolutionary army. He then devoted himself to the study of law. In 1782 and in 1787 he was elected a member of the Virginia Assembly, and from 1783 till 1786 he represented Virginia in Congress. In 1788 as a member of the Convention of Virginia he strenuously opposed the ratification of the new Federal constitution. In 1790 he was elected to the Senate of the United States. In 1794–96 he was minister plenipotentiary to France. From 1799 till 1802 he was governor of Virginia, and in 1803 he returned as envoy-extraordinary to France on a mission which resulted in the acquisition of Louisiana for 15,000,000 dollars. He was afterwards employed in diplomacy in England and Spain. In 1811 he was governor of Virginia, in 1811–17 he was secretary of state, being secretary of war in 1814–15. In 1816 the democratic republican party elected him to the presidency of the United States. In 1820 he was re-elected, only one vote being cast against him. This he owed chiefly to his having procured the cession of Florida by Spain, and to the settlement of the vexed question of the extension of slavery by the Missouri compromise (which see). Mexico and the emancipated states of South America were formally recognized by the American government during Monroe's second term; but the leading event in it was the promulgation of the 'Monroe doctrine' (which see).

Monroe Doctrine, THE, a principle in international politics, corresponding in America to the balance of power in Europe, was formulated in President Monroe's message of December 2, 1823, in the statement that the United States would consider any attempt to extend the European political system to any portion of America, as dangerous to their peace and safety. At the same time the American continents were declared to be no longer subjects for colonization by any European power. The doctrine has several times been asserted, notably in the attitude of the United States towards Napoleon III. during his Mexican undertaking, and more recently in the history of the Panama Canal. Though the doctrine has all the force of a first principle in the United States, it has, curiously enough, never been formally sanctioned by Congress.

Monro'via, a seaport of W. Africa, the capital of the State of Liberia, founded in 1824, and named after President Monroe. Pop. 1891, 5000.

Mons (mons; Flemish, *Bergen*), a fortified town of Belgium, capital of the province of Hainault, 27 miles E.S.E. of Tournay, on the Trouille, here crossed by four bridges. It was until 1862 one of the strongest fortresses of Europe, but the fortifications were then demolished and their site occupied by a fine boulevard. The principal buildings are the late Gothic church of St. Waltrude (Ste. Waudru), built in 1450–1589; the late Gothic town-hall, dating from the middle of the 15th century; and the Renaissance belfry (1662), belonging to the old palace, which is now a lunatic asylum. The manufactures consist of linen, woollen, and cotton fabrics, firearms, cutlery, soap, &c. Coal is extensively mined in the vicinity. In 804 Mons, which occupies the site of one of Cæsar's forts, was made the capital of Hainault by Charlemagne. It has figured much in history. Pop. 1891, 25,187.

Monseigneur (mon-sān-yeur; abbreviated *Mgr.* pl. *Messeigneurs*), a title of dignity in France. Under Louis XIV. the dauphin was styled *monseigneur*, without any addition. Princes, dukes and peers, archbishops, bishops (who adopted the title at the close of the 17th century), cardinals, marshals of France, presidents of parliament, &c., were addressed by this title.

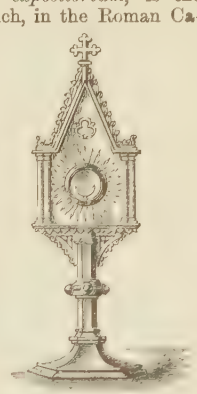
Monsieur (mo-syeu; abbreviated *M.*; plural *Messieurs*, abbreviated *MM.*), used without any addition, formerly in France designated the king's eldest brother, though, in addressing him, the title Monseigneur was used. The last prince so called was the Comte d'Artois,

brother of Louis XVIII. In common use it answers both to the English *sir* and *Mr.*, and is also used before titles.

Mon'soon, the name given to a certain modification or disturbance of the regular course of the trade-winds which takes place in the Arabian and Indian seas. Between the parallels of 10° and 30° south latitude the eastern trade-wind blows regularly, but from the former parallel northwards the course is reversed for half the year, and from April to October the wind blows constantly from the south-west. During the other six months of the year the regular north-east trade-wind prevails. These two alternating winds are the monsoons proper, but the name is now commonly given to similar alternating winds in any region.

Monster, or MONSTROSITY, a term applied in anatomy and physiology to living beings which exhibit from birth onwards some important abnormal features in structure, or present notable deviations from the normal type of their kind. The science which investigates such normal forms is known as *teratology*. Monsters present very wide variations in the characters and degrees of the malformations, ranging from an almost imperceptible to an almost total deviation from the normal type. But there are definite types of monstrosities, distinguished by distinct anatomical characters, just as there are definite types of normal structure; and the former may be classified by considering the fœtus or embryo. The anatomist may at once detect all fictitious cases of monstrosities by noting that they present characters perfectly incompatible with any known type of abnormal development. Tales of monsters occurring both in man and in beasts are met with in the writings of the older anatomists and naturalists; but such accounts, if not entirely destitute of truth, owe most of their interest to the liberal embellishment with which they have been recorded. Old writers have argued for the production of such ideal monsters by the intercourse of demons and women, of brutes and men; and witchcraft, magic, spell, divine vengeance—and, more lately, the effect upon the mother's mind of fright, terror, dreams, &c.—have each and all been credited, but equally erroneously, with causing malformations and abnormalities in the yet unborn child or embryo. Teratology can explain most, if not all malformations, as results of abnormal growth or disease. These so-called '*freaks* of nature' are in truth the results of morbid actions and operations in the living organism, as well defined, but not yet so well known, as are those of the healthy and normal body. Among the prominent or primary causes in the production of monstrosities in the human embryo are the following:—Deficiencies or deformations in the reproductive organs and materials of the father or mother, or of both parents; diseases or malpositions of the placenta or after-birth, or of the fœtal membranes; retardation in the development of the fœtus itself, arising from pressure, injuries, or actual disease either originating from the germ itself or communicated from the mother; and the presence of actual or potential disease in either or both parents. Injuries to the mother may also to some extent affect the embryo, though most authorities are doubtful on the point. Malformations and monstrosities are frequently met with in the lower animals, and particularly in those which are domesticated by man. In the plant world monstrosities also occur.

Mon'strance, or REMONSTRANCE, called also *ostensorium* or *expositorium*, is the sacred vessel in which, in the Roman Catholic Church, the host is shown to the people at benedictions, processions, and other solemnities. Its use probably dates from the establishment of the festival of Corpus Christi in 1264 by Pope Urban IV. The earliest monstrances known date from the 14th century, and are made in the form of a Gothic tower. The most common form now consists of a chalice-footed stand of some precious metal, and a circular repository, usually a transparent pyx, surrounded by sun-like rays. In the Greek Church the monstrance is shaped like a coffin.


Monstrance.

Montagnards (mon-tàn-yär), or LA MONTAGNE, 'the Mountain,' a popular name in French history, given to the extreme democratic party in the Convention, because they occupied the higher rows of benches in the hall where it met. The chiefs of 'the Mountain' were Danton, Marat, and Robespierre,

the men who introduced the 'Reign of Terror.' The Mountain rose to the height of its power in June, 1793, and for more than a year it was sufficiently formidable to stifle all opposition. Soon after the fall of Robespierre (July 28th 1794) the names of 'Montagnard' and 'Montagne' gradually disappeared from party nomenclature. A futile attempt was made by the extreme party in the National Assembly, after the revolution of 1848, to revive the title of 'Mountain.'

Mon'tagu, LADY MARY WORTLEY, famous for her brilliant letters, was born in 1689, and died in 1762. She was the eldest daughter of Evelyn Pierrepont, afterwards duke of Kingston. In 1712 she made a runaway match with Mr. Edward Wortley Montagu, a wealthy Whig scholar, who had quarrelled with her father. On the accession of George I. in 1714 Mr. Montagu obtained an official position in London, and Lady Mary emerged from the rural seclusion in which she had hitherto spent her life. Her beauty and elegance and her wit and vivacity rapidly gained her admiration and influence, and she became familiarly acquainted with Addison, Congreve, Pope, and other distinguished writers. In 1716 Mr. Montagu was appointed ambassador to the Porte, and Lady Mary accompanied him to Constantinople, where they remained from Jan. 1717 to May 1718. It was during this period that Lady Mary's famous 'Turkish Letters' were written. On her return to England she resumed her ascendency in the gay world of wit and fashion. She had, however, the misfortune to quarrel with Pope, and a long and keen literary war ensued, which did honour to neither. In 1739, for reasons never satisfactorily explained, Lady Mary left England to spend the remainder of her days on the Continent. She did so with the full concurrence of her husband, and her subsequent correspondence with him betrays neither humiliation nor resentment. Lady Mary remained abroad, living chiefly in Italy, until her husband's death in 1761; but soon after her return to England she herself died of cancer in the breast. Her letters are marked by great vivacity and graphic power, together with keen observation and independent judgment. Lady Mary has another claim to remembrance in her courageous adoption of the Turkish practice of inoculation for smallpox, and for her energy in promoting its introduction into England.

Montague, Franklin co., Mass., has extensive manufactories. Pop. 1890, 6296.

Montaigne (mon-tān'; Fr. pron. mon-teny), MICHEL EYQUEM DE, the famous French essayist, was born in 1533 at the castle of Montaigne, in Périgord. He learned Latin conversationally before he could speak French, and Greek was also an early acquisition. At the age of six he became a pupil at the Collége de Guienne at Bordeaux, and at thirteen he began to study law. Little is known of his youth and early manhood. He was a parliamentary counsellor from 1554 till 1567; he seems to have seen some military service in 1556; he married the daughter of a fellow counsellor; and at some period was appointed a gentleman of the chamber to the king. In 1571, however, he retired to his ancestral château, and devoted himself to peaceful study and meditation. In 1580 he published the first two books of his Essais, and immediately afterwards set out on a journey through Germany, Switzerland, and Italy to restore his health, which had been shattered by the attacks of a hereditary disease. In 1582 and 1584 he was chosen mayor of Bordeaux. In 1588 he republished his Essais, with the addition of a third book. After a last visit to Paris (in the course of which he was thrown into the Bastille for a short time by the Leaguers) Montaigne seems to have dwelt quietly in his château. He died of quinsy in 1592. Montaigne's Essais have at all times been one of the most popular books in the French language. They embrace an extraordinary variety of topics, which are touched upon in a lively entertaining manner, with all the raciness of strong native good sense, careless of system or regularity. Sentences and anecdotes from the ancients are interspersed, with his own remarks and opinions, and with stories of himself in a pleasant strain of egotism, and with an occasional license, to which severer moralists can with some difficulty reconcile themselves. His Voyages, a diary of his journeys in 1580–82, the MS. of which was discovered 180 years after his death, were published in 1774. There are two English translations of the Essais, one by Charles Cotton, and an earlier one by John Florio.

Montalambert (mon-tà-làn-bār), CHARLES FORBES RENÉ, COMTE DE (1810–70), French publicist, politician, historian, and theologian, born in London 1810, died at Paris 1870. His father was a French emigré, afterwards a peer of France under the Res-

toration; his mother was English. Till 1819 Montalambert's education was carried on in England; but it was concluded in Paris. At the age of twenty he enthusiastically supported Lamennais and Lacordaire in their movement to promote liberty within the church; but when L'Avenir, the organ of the movement, was condemned by an encyclical letter from the pope in August 1832, he turned his attention elsewhere. In 1835 he took his seat in the chamber of peers, and his eloquence, sincerity, and ability soon made him one of the most influential orators in the chamber. After the revolution of 1848 he was elected a member of the National Assembly. He was at first inclined to support Napoleon III., but was soon alienated by the policy of that emperor. Failing to be elected in 1857 he spent the remainder of his life in writing and travelling. Montalambert was an ardent lover of liberty, and yet a firm believer in aristocracy and ultramontanism. He had a profound admiration for the social and political institutions of England. Of his very numerous writings the chief is his Monks of the West—Les Moines d'Occident depuis St. Benoit jusqu'à St. Bernard (Eng. transl. 1861–68). Others are Vie de Ste. Elisabeth de Hongrie (1836) and L'Avenir Politique d'Angleterre (1855).

Montana (mon-tă'na), one of the United States, organized as a territory in 1864 out of portions of the territories of Idaho and Dakota, admitted as a state in 1889. It is bounded on the north by the British possessions, and its area is about 146,080 sq. miles. The population in 1880 was 39,159; in 1890 the State contained 132,159, about 10,500 of whom were Indians, whose 'Reservations' include about 45,000 square miles of fertile agricultural and grazing lands. The surface is generally mountainous, the great range of the Rocky Mountains extending across the state, while minor chains occur in different parts. The principal rivers are the Missouri, the Yellowstone, and Clark's Fork of the Columbia. The eastern part of the state is chiefly occupied by dry and infertile plateaus, but the mountain-valleys in the west are highly fertile. The rainfall is exceedingly scanty, and irrigation is almost everywhere necessary for agriculture, which, however, is steadily increasing in extent and value. The raising of live stock is also an advancing branch of industry. There is much excellent grazing land. The mineral wealth is very great. It was the discovery of gold and silver in large quantities that led to the original settlement of Montana; and in 1889 the latter metal was produced to the value of $20,038,871, the former to the value of $3,794,010. Copper, lead, and iron are also found, and large deposits of coal have been discovered. Among the animals are the bison or buffalo (now nearly extinct), the grizzly bear, the Rocky Mountain sheep, the moose, and the antelope. The pine, fir, and cedar abound. The Northern Pacific Railway crosses the State. The capital is Helena. State pop. 1890, 132,159.

Monta'nus, the founder of a Christian sect, appeared about the middle of the 2d century in Phrygia, as a new Christian prophet, advocating an ascetic code of morals and behaviour, fasting, celibacy, and willing submission to martyrdom. He sought to establish a community of all true believers at Pepuza in Phrygia, there to await the second Advent. The Montanists were forced to withdraw from the Catholic Church and form themselves into a separate sect in Phrygia about 180. In North Africa they flourished for some time, but by the 4th century they seem everywhere to have disappeared.

Montargis (mon-tär-zhē), a town of France, department of Loiret, on the Loing, 39 miles E.N.E. of Orleans. It has the remains of a fine castle, a favourite royal residence before Fontainebleau. Montargis has manufactures of paper, &c. Pop. 10,984.

Montauban (mon-tō-bän), chief town of the department of Tarn-et-Garonne, in France, is finely situated on the Tarn, 120 miles S.E. of Bordeaux. Active manufactures of silk, wool, &c., are carried on. Montauban was a stronghold of the Huguenots, and the Protestants still maintain an academy and a theological college. Pop. 17,298.

Montbéliard (mon-bā-li-är; Ger. *Mömpelgard*), a walled town of France, in the department of Doubs, 40 miles north-east of Besançon. It is a busy industrial town, with manufactures of clocks and watches, hardware, and textile fabrics. Pop. 8150.

Mont Blanc (that is 'White Mountain'), the loftiest mountain of Europe, belonging to the Pennine chain of the Alps, and rising 15,781 feet above the sea-level, is situated on the frontiers of France and Italy, and near that of Switzerland. The main portion of the mountain and the highest summit are in France (Haute Savoie). The huge mountain mass (30 miles long by 10 miles wide) is almost entirely granitic. It has

numerous summits, some rounded, some sharp (aiguilles). On the S.E. its face is steep; on the N.W. lateral chains are sent off, among which about thirty glaciers are counted. The chief are the glaciers Des Bossons, Bois, Argentière, and Mer de Glace. The summit was first reached in June, 1786, by the guide Jacques Balmat.

Montbrison (moṇ-brē-sōṇ), a town of France, dep. Loire, on the Vizezy. Pop. 6235.

Montcalm (moṇ-käm), LOUIS JOSEPH SAINT VERAN, MARQUIS DE, French general, born in 1712. Having entered the army he distinguished himself in several campaigns in Europe, and in 1756 was appointed to the chief command of the French troops in Canada. Here he took Fort Ontario (Oswego) and Fort William Henry (on Lake George), and occupied Ticonderoga (1758); but at Quebec in 1759 was completely defeated by General Wolfe on the Heights of Abraham, both commanders being mortally wounded.

Mont Cenis. See *Cenis.*

Mont de Marsan (moṇ dė mȧr-säṇ), a town of France, capital of the department of Landes, at the junction of the Douze and Midou. Pop. 8634.

Mont-de-Piété (moṇ-dė-pē-ā-tā; in Italian *Monte di Pietà*), a name for banks of charity which lend money on pledges at a low rate of interest, and whose aim is purely philanthropic. These institutions were established to prevent the scandal and abuse of usury, and exist in Italy, France, the Netherlands, Spain, &c. In Britain pawnbrokers take the place of monts-de-piété.

Mont Dore (moṇ dōr), a village with mineral springs and baths in Central France, dep. Puy de Dôme, situated among the mountains known as Monts Dore, highest summit Puy de Sancy (6100 ft.). Pop. 1500.

Montebello, a village in N. Italy, 25 miles E.N.E. from Alessandria, noted for two Austrian defeats. On June 9th, 1800, the victors were the French under Lannes, afterwards Duke of Montebello; and on 20th May, 1859, the allied troops of France and Sardinia under Gen. Forey. Pop. 1717.

Monte Carlo. See *Monaco.*

Monte Casino, a famous Italian Benedictine monastery near San Germano, on the route between Rome and Naples. It was founded in 529 by St. Benedict on the site of an ancient temple of Apollo, to which Dante alludes, and which commands a magnificent prospect. It became renowned for its privileges and wealth, and its library rich in MSS. As a monastery it was dissolved in 1866, but it continues to exist in the form of an educational establishment. The church is magnificent, and contains the remains of St. Benedict.

Monte Cristo, a small island 6 miles in circumference belonging to Italy, 25 miles S. of Elba, the seat of a penal colony. Dumas has given the name of this isle to the hero of one of his most popular romances.

Montecu'culi, or, more correctly, MONTECU'COLI, RAIMONDO, Prince of the Empire, and Duke of Melfi, military commander, born near Modena in 1608, died at Linz 1680. He entered the Austrian service, and served during the Thirty Years' war with great distinction. After the Peace of Westphalia (1648) he visited Sweden and England in a diplomatic capacity; and in 1657 the emperor sent him to the aid of the King of Poland against Rakoczy and the Swedes, and next year he assisted the Danes against the latter. In 1664 he gained a great victory over the Turks after having driven them out of Transylvania. In 1673 he was placed at the head of the imperial troops, and checked the progress of Louis XIV. by the capture of Bonn, and by forming a junction with the Prince of Orange in spite of Turenne and Condé. Montecuculi's subsequent advance into Alsace was repulsed by the Prince of Condé. His last military exploit was the siege of Philipsburg.

Montefiore (mon-te-fi-ō'rā), SIR MOSES, Jewish philanthropist and centenarian, was born 24th October 1784, died 28th July 1885. In 1837 he was chosen sheriff of London, the same year he was knighted, and in 1846 he was made a baronet. His benevolence to Jews throughout the world was unbounded; and he visited Palestine seven times, the last when in his 92d year.

Monte'go Bay, a seaport, situated on a bay of the same name on the N.W. coast of Jamaica. The bay is an open roadstead, and is exposed to storms from the north. Pop. 4651.

Montélimar (moṇ-tā-li-mär), a town of France, dep. of Drôme, at the junction of the Roubion and Jabron, formerly a stronghold of the Huguenots. Its old castle is now used as a prison. It has manufactures of silk, hats, leather, &c. Pop. 9445.

Montemayor', JORGE DE, a Spanish poet, born about 1520, died 1561. In his youth he was a soldier, but he afterwards entered the service of Philip II. as a singer, and

accompanied that prince abroad. After his return he lived in Leon, where he wrote his celebrated Diana Enamorada (1542), the earliest Spanish pastoral romance.

Montene'gro (native *Tzrnagora*, Turkish *Karadagh*, all meaning Black Mountain), an independent principality in Europe, in the north-west of Turkey, bounded by Herzegovina, Albania, the Adriatic, and Dalmatia. Area, about 3630 sq. miles. The surface is everywhere mountainous, being covered by an extension of the Dinaric Alps, rising to the height of 8850 ft. There are, however, a few beautiful and verdant plains and valleys, in which the soil is tolerably fertile. The principal river is the Moratcha. About half of the Lake of Scutari, besides several smaller lakes, lies within the Montenegrin boundary. The climate is healthy. Forests of beech, pine, chestnuts, and other valuable timber cover many of the mountain sides. Fruit-trees of all kinds abound, especially in the sheltered valleys, where even almonds, vines, and pomegranates ripen. Agriculture is in a very rude and inefficient state, though every cultivable piece of land is planted with Indian corn, potatoes, tobacco, rye, wheat, cabbages, or some other useful plant. Sheep, cattle, and goats are reared in great numbers. Manufactures, with exception of a coarse woollen stuff, are unknown. The chief occupations of the Montenegrins are agriculture and fishing, trade being altogether left to foreigners. The exports are sheep and cattle, mutton-hams, sumach, honey, hides, cheese, butter, and other agricultural produce. The chief towns (in reality little more than villages) are Cettinje (2000 inhabitants), the capital; Podgoritza (4000 inhabitants); Niksich; and the seaports Dulcigno and Antivari. The Montenegrins are pure Serbs and speak a Serbian dialect. They are generally of tall stature and well proportioned. The men go at all times fully armed, whatever be the occupation in which they are engaged, and all between 14 and 50 years of age (estimated at 29,000) are liable to military service. In religion they are of the Greek Church. Education, once neglected, is now free and compulsory. Montenegro is nominally a constitutional monarchy, with a state council of eight members, but the prince is practically absolute. The revenue is estimated at about $300,000. The population amounted in 1890 to 245,380.

Montenegro, first appearing as a principality under the name of Zeta in the 14th century, was subject to the great Servian kingdom till about 1389. In 1516 the secular prince abdicated in favour of the Archbishop Vavil, who then formed Montenegro into a theocratic state, under an autocratic vladika or celibate prince-bishop. The dignity was inherited through brothers and nephews, and after 1697 became hereditary in the family of Petrovitch Njegos. The history of Montenegro for many years is a record of deadly struggles with the Turks, and of a slowly-growing civilization among its inhabitants. In 1852 Danilo I. became vladika, but in 1855 he married, threw off his ecclesiastical character, assuming the title of Hospodar or prince, and transformed his land into a secular principality, the independence of which was soon recognized by Russia. Danilo was assassinated in 1860, and the present prince, Nicolas I. Petrovitch, became Hospodar. In 1861–62 he engaged in a not altogether successful war against Turkey; but in 1876 he joined Servia and in 1877–78 Russia against his hereditary foe, with the result that 1900 square miles were added to his territory by the Treaty of Berlin.

Montereau (mon-tē-rō), a town of France, department of Seine-et-Marne, at the confluence of the Yonne and the Seine. Pop. 7709.

Monterey (mon-te-rā'ī), capital of the state of New Leon, in Mexico, about 100 miles from the Texas frontier. Monterey, which is said to be the most Americanized town in Mexico, has a considerable transit trade. In 1846 it was captured by the United States troops under Gen. Taylor. Pop. 1890, 41,700.

Monte Rosa. See *Rosa.*

Monte-Sant'-Angelo, a town of S. Italy, 28 miles north-east of Foggia, has a picturesque castle and numerous churches. Pop. 17,242.

Monte Santo. See *Athos.*

Montespan (mon-tes-pän), FRANÇOISE ATHENAÏS, MARCHIONESS DE, mistress of Louis XIV., born in 1641, was the second daughter of the Duke of Mortemart, and was, in 1663, married to the Marquis de Montespan. To the most fascinating beauty she added a natural liveliness and wit, and a highly cultivated mind. Soon after her appearance at court she attracted the king's attention, and from 1668 till 1674 she shared his favour with Mlle. de la Vallière. The latter, however, withdrew in 1674; M. de Montespan had already been ordered to

retire to his estate. Mme. de Montespan bore eight children to the king, four of whom died in infancy. The others were intrusted to the care of Mme. Scarron, afterwards De Maintenon. The influence of the favourite mistress was often exercised in public affairs, and her empire over the king continued until about 1679, when a growing attachment to Mme. de Maintenon finally estranged his affections from Mme. de Montespan. She rarely appeared at court after 1685, and in 1691 she entirely quitted it. Her last years were devoted to religious exercises, acts of benevolence, and penitence.

Montesquieu (mon-tes-kyeu), CHARLES LOUIS DE SECONDAT, BARON DE LA BRÈDE ET DE, born 1689 at the château of La Brède, near Bordeaux; died at Paris 1755. He studied law; in 1714 became a counsellor of the parliament of Bordeaux; and in 1716, on the death of his uncle, parliamentary president and Baron de Montesquieu. The Lettres Persanes, the first of the three great works on which his fame principally rests, appeared in 1721. Purporting to consist of the correspondence of two Persians travelling in France, this book is a lively satire upon the manners and customs, and the political and ecclesiastical institutions of the author's age and country. Other works of less importance followed; and in 1728 Montesquieu was admitted to the French Academy. He gave up his president's office in 1726, and then visited Germany, Hungary, Italy, Holland, and England. In England he stayed for eighteen months, and imbibed a deep admiration for its social and political institutions. He returned to France in 1731, and in 1734 he published his Considérations sur les Causes de la Grandeur et la Décadence des Romains. In 1748 L'Esprit des Lois, the result of twenty years of labour, was published, and at once placed its author among the greatest writers of his country. The scope of the work is perhaps best indicated by the sub-title of the original edition, which describes it as a treatise on the relation which ought to exist between the laws and the constitution, manners, climate, religion, commerce, &c., of each country. Among his lesser works are Dialogue de Sylla et d'Eucrate; Le Voyage de Paphos; Essai sur le Goût (unfinished); Arsace et Isménie (probably a work of his youth); Lettres Familières; &c.

Montevid'eo, capital of Uruguay, is situated on a small peninsula on the north coast of the estuary of the La Plata, 130 miles east-south-east of Buenos Ayres. Montevideo is one of the best built towns in South America, and enjoys one of the finest climates. The principal buildings are the cathedral, the town-house, the Solis opera-house, the custom-house, exchange, &c. There is a university with 60 professors and nearly 700 students. The commercial development of Montevideo, considerable as it is, has been much retarded by the shallowness of its long-neglected harbour. A company is now engaged in excavating a port to admit vessels of 25 ft. draught. Extensive dry docks have also been recently constructed. Over ⅞ per cent of the tonnage entering and clearing at Montevideo is British. The chief exports are wool, hides, tallow, dried beef, and extracts of flesh. The chief imports are British cottons, woollens, hardware, and other manufactured articles. Montevideo sends out above half the whole exports of Uruguay, and receives all but a small fraction of the imports. Pop. 134,346, one-third of whom are foreigners.

Montezu'ma, Aztek emperor of Mexico when Cortez invaded the country in 1519. Influenced by an ancient prophecy, he at first welcomed the Spaniards; but when he discovered that they were no supernatural beings, he secretly took measures for their destruction. Cortez on learning this seized Montezuma, and compelled him to recognize the supremacy of Spain. The Azteks immediately rose in revolt, and refused to be quieted by the appearance of Montezuma. While urging them to submission he was struck on the temple with a stone and fell to the ground. Cut to the heart by his humiliation, he refused all nourishment, tore off his bandages, and soon after expired.

Montfort, SIMON DE, Earl of Leicester, famous in the constitutional history of England, was born in France between 1195 and 1200. He was the youngest son of Simon de Montfort, Earl of Leicester, the 'scourge of the Albigenses.' He won the favour of Henry III., and married Eleanor, countess dowager of Pembroke, and sister of the king. From 1248 till 1252 he acted as the king's 'locum tenens' in Gascony; but complaints of his despotic rule led to a trial before the lords, which resulted in his acquittal and a violent, though temporary, quarrel with Henry. De Montfort withdrew to France, where he declined the important office of high steward, and on his return to England in 1254 took a prominent part in the disputes

between the crown and the barons; giving proof, however, of broader constitutional principles than the other great barons, who thought merely of the privileges of their own order. He was conspicuous among those who extorted the Provisions of Oxford from the king in the 'Mad Parliament' in 1258; and he was the leader of the barons in the so-called 'Barons' War' that followed. In 1264 he agreed to submit the question of the king's right to repudiate the Provisions to Louis XI. of France; but when the latter, by the Mise of Amiens, decided in favour of Henry, De Montfort refused to be bound by the decisio[illegible] Both sides took up arms, and at the ba[illegible] Lewes (May 14th, 1264) the king was [illegible]ated and taken prisoner. The Mise of Lewes, to which Henry III. agreed, contained the outlines of a new constitution, in which the principle of representative government was recognized; but this principle was carried a step farther in the famous parliament of De Montfort, which was summoned to meet at Westminster on January 20th, 1265. The distinctive feature of the new parliament was the fact that, for the first time, writs were issued for the election of members from cities and boroughs as well as from the counties. For this reason Simon De Montfort is sometimes spoken of as the 'founder of the House of Commons;' though the regular representation of cities and boroughs in parliament did not really begin till 1295. The king accepted the constitution on Feb. 14th, 1265; but Prince Edward and the Mortimers raised the standard of revolt. At the battle of Evesham (Aug. 4th, 1265) De Montfort was defeated and slain. His memory was long revered by the people as a martyr for the popular liberty. See also *England* (*History*) and *Henry III.*

Montgolfier, Joseph Michel (1740–1810) and Jacques Étienne (1745–1799), joint-inventors of the balloon, were born at Vidalon-lès-Annonay, in the department of Ardèche, in France. Their first balloon, inflated with rarefied atmospheric air, ascended from Annonay in 1782, and the invention soon brought them fame and honours. Joseph was also the inventor of the water-ram. See *Aeronautics.*

Montgom'ery, or Montgomeryshire, an inland county in North Wales, has an area of 495,082 acres, consisting mostly of wild, rugged, and sterile mountains, varying from 1000 to 2000 feet in height. It contains, however, some fine and fertile valleys, the most extensive and fruitful of which is that of the Severn, the principal river. The county is almost entirely occupied by the slate-rocks which overspread so large a portion of Wales. Lead and zinc are procured, and also some copper. The cultivation of the soil is carried on chiefly in the narrow valleys, and on the east side of the county, bordering on Salop. Wheat and oats are the principal crops; and orchards and gardens are numerous on the east side of the county. In the hilly districts cattle and great numbers of small and hardy ponies, commonly called *merlins*, are reared. Flannels are manufactured, as are also a kind of cottons called 'Welsh plains.' Montgomery is the county town, but the largest town is Welshpool. The county sends a member to parliament. Pop. 58,003. —Montgomery, the county town, a mere village, belongs to the Montgomery district of boroughs, which includes Llanfyllin, Llanidloes, Machynlleth, Montgomery, Newton, and Welshpool. Pop. 1194.

Montgomery, a city of the United States, capital of Alabama, on the left bank of the navigable Alabama river. The principal buildings are the state-capitol, the United States court-house, and a number of churches. Montgomery contains several foundries, flour and oil mills, and a cotton factory; and carries on an extensive trade. Pop. 21,883.

Montgomery, Alexander, a Scottish poet who flourished during the latter half of the 16th century, was born at Hazelhead Castle in Ayrshire. He seems to have experienced the fluctuating fortune of a courtier, at first in the service of the regent Morton, and afterwards in that of James VI., who granted him a pension. He died probably between 1605 and 1610. His principal poem, the allegory of the Cherry and the Slae, was first published in 1597. Many of his sonnets and miscellaneous pieces, some of which have considerable merit, were written much earlier and circulated in manuscript.

Montgomery, James, the 'Christian Poet,' was born in 1771 at Irvine, Ayrshire, where his father was a Moravian preacher; died at Sheffield 1854. He was educated at the Moravian school of Fulneck, near Leeds, and in 1792 became editor of the Sheffield Iris, a liberal dissenting paper, a post which he held till 1825. He was twice imprisoned (1795–96) for political offences in his newspaper; and in 1797 he published his first volume of poems, under the name of Prison

Amusements. In 1806 appeared his Wanderer in Switzerland, the first effort of his which gained the approbation of the public, though severely handled by the Edinburgh Review. It was followed in 1809 by the West Indies; in 1813 by The World before the Flood; in 1819 by Greenland, a missionary poem; and in 1827 by The Pelican Island, perhaps his best work. He also wrote a number of hymns and other small pieces, which were published along with his longer poems.

Montgomery, RICHARD, soldier, was born in Ireland in 1736. After serving with credit in the English army, in 1775 was delegate to the 1st Provincial Congress. In an expedition to Canada was second in command, and succeeded in capturing Montreal. He fell in a gallant attack on Quebec, 1775.

Montgomery, ROBERT (1807–55), a prolific versifier, is chiefly famous for having been mercilessly ridiculed by Lord Macaulay in the Edinburgh Review. He was born at Bath in 1807, and having taken orders in the Church of England, officiated at Percy Street chapel in London till his death in 1855, with an interval of four years as pastor of St. Jude's Episcopal chapel in Glasgow. His chief works, which amply justify Macaulay's strictures, though hardly their tone, are The Omnipresence of the Deity (1828); Satan (1830), whence his sobriquet of 'Satan Montgomery;' and The Messiah.

Month, a period of time derived from the motion of the moon; generally one of the 12 parts of the calendar year. The calendar months have from 28 to 31 days each, February having 28, April, June, September, and November 30, the rest 31. Month originally meant the time of one revolution of the moon, but as that may be determined in reference to several celestial objects there are several lunar periods known by distinctive names. Thus the *anomalistic month* is a revolution of the moon from perigee to perigee, average 27 days 13 hrs. 18 min. 37·4 sec.; the *sidereal month*, the interval between two successive conjunctions of the moon with the same fixed star, average 27 days 7 hrs. 43 min. 11·5 sec.; the *synodical*, or *proper lunar month*, the time that elapses between new moon and new moon, average 29 days 12 hrs. 44 min. 2·9 sec. The *solar month* is the twelfth part of one solar year, or 30 days 10 hrs. 29 min. 5 sec.

Monti, VINCENZO, Italian poet, born in 1754, died 1827. Educated at Faenza and Ferrara, in 1778 he went to Rome, where he wrote two tragedies—Aristodemo and Galeotto Manfredi—the splendid style of which was admired, although the plots were thought too tragic, and dramatic action was wanting. The murder of the French ambassador Basseville at Rome in 1793 gave occasion to his fiercely anti-republican poem Bassvilliana, in which he closely imitates Dante. Subsequently Napoleon appointed him secretary of the directory of the Cisalpine Republic in Milan, and finally historiographer of the kingdom of Italy. In this last-named capacity the poet published in Napoleon's honour his Bardo della Selva Nera, which, however, was received with disapprobation. Monti also published a third drama, Caio Gracco, and translated Homer's Iliad. He died in 1827 at Milan.

Montilla (mon-tēl'yà), a town in Spain, prov. of Cordova; produces a fine variety of sherry, dry and rather bitter, variously known as Montilla and Amontillado. Pop. 13,207.

Montluçon (moṇ-lû-sōn), a town in France, department of Allier, on the Cher, 40 miles S.W. of Moulins, was a strong fortress during the middle ages. Portions of the walls and towers still remain. The castle, on a height above the river, dates from the 15th and 16th centuries. The manufactures are plate-glass, iron, cutlery, &c. Pop. 26,079.

Montmoren'cy, a small river of Canada, which rises in Snow Lake, prov. of Quebec, flows south, and joins the St. Lawrence 8 miles below Quebec. Near its mouth are the Falls of Montmorency, which have a breadth of about 50 feet, and a perpendicular descent of 242 feet.

Montmorency (moṇ-mo-rân-si), the name of a noble family of France and the Netherlands, derived from the village of Montmorency near Paris. One of its most distinguished members was ANNE DE MONTMORENCY, first duke of Montmorency, Constable of France, and a distinguished general, born in 1492. He distinguished himself at the battle of Marignano in 1515, and for his valour at Bicocca in 1522 was made marshal. He was taken prisoner along with Francis I. at the battle of Pavia in 1525, but was soon after ransomed. In 1536 he defeated Charles V. Francis I. conferred on him the dignity of Constable in 1538. In 1551 he was made a duke. In 1557 he lost the battle of St. Quentin against

Philip II. of Spain, and was taken prisoner, but he regained his freedom by the Peace of Cateau-Cambrésis in 1559. Under Charles IX. he joined the Duke of Guise and Marshal St. André in forming the famous triumvirate against Condé and the Huguenots. At the battle of Dreux in 1562 Montmorency was made prisoner by the Huguenots; on the renewal of the civil war he gained a decisive victory over them at St. Denis, November 10, 1567, though the following day he died of his wounds. His grandson, Duke Henry II., born in 1595, was in his eighteenth year created Admiral of France. He fought successfully against the Huguenots and Spaniards, and was made a marshal; but having joined Gaston, duke of Orleans, in rebellion against the influence of Richelieu, he was taken prisoner at the battle of Castelnaudary, and executed at Toulouse as a traitor in 1632.

Monto'ro, a town of Spain in Andalusia, 27 miles north-east of Cordova, is situated on the Guadalquivir, which is here crossed by a handsome bridge of the 16th century. Pop. 13,293.

Montpellier (mon-pel-yā), chief town of the department of Hérault, in France, is situated in a picturesque region, on the Lez, about 6 miles north of the Mediterranean and 80 miles W.N.W. of Marseilles. It is one of the handsomest towns of the south of France. Among its noteworthy features are the Peyrou, a splendid promenade, on which is the so-called Château d'Eau, at the termination of a noble aqueduct; the citadel; the cathedral; the Palais-de-Justice; and the Porte de Peyrou, a triumphal arch of the Doric order. Montpellier is well equipped with educational and other institutions, and since the 12th century has been famous for its school of medicine, said to have been founded by Arab physicians driven out of Spain. There are also 'faculties' of law, science, and literature, and a public library of 100,000 vols. The botanical garden, begun under Henri IV., is the oldest in France. Montpellier manufactures cottons, candles, soap, verdigris, chemicals, &c. It carries on an active trade, Cette serving as its harbour. Montpellier was a stronghold of the Huguenots, and suffered much in the religious wars. The edict of Montpellier (Oct. 20, 1622) granted the free exercise of their religion to Protestants, and confirmed the Edict of Nantes. Pop. 1891, 69,258.

Mont Perdu, 11,057 feet, the fourth highest summit of the Pyrenees, rises on Spanish territory, about 100 miles E. of the Bay of Biscay, and 50 miles S.E. of Pau.

Montreal, the largest city and the commercial capital of the Dominion of Canada, is situated on an island of the same name, formed by the mouths of the Ottawa, where, after a course of 750 miles, it debouches into the St. Lawrence. It is built upon the left or northern bank of the St. Lawrence, and is situated 180 miles S.W. of Quebec and

985 miles by river from the Atlantic Ocean. Behind the town rises the Mount Royal (Mont Real), from which it derives its name, and which is reserved as a public park. Situated at the junction of the inland and the ocean navigation, it has a harbour with three miles of wharfage accessible to steamers of the deepest draught, and at present it is being greatly improved and extended. There are numerous lines of steam-ships which have their Canadian headquarters at Montreal. It is also the chief terminus of the Grand Trunk Railway, and the eastern terminus of the Canadian Pacific Railway. The city, which is one of the most attractive in Canada, contains many handsome public buildings; and is divided

into distinctly marked English and French quarters. The chief public buildings are the court-house, the barracks, Bonsecours Market, custom-house, city hall, &c.; and the principal churches are St. Peter's Cathedral, constructed on the model of St. Peter's at Rome, the church of Notre Dame (large enough to accommodate 10,000 persons), St. Patrick's, Christ Church Cathedral, St. Andrew's, St. Paul's, &c. M'Gill University, Presbyterian College, Wesleyan Theological College, Congregational College, Anglican Diocesan College, Bishop's College and University, the Montreal School of Medicine and Surgery, are the leading Protestant educational institutions; those of the R. Catholics comprise Laval University, St. Mary's College, Montreal College, Hochelaga Convent, &c. There are several libraries besides those of the above institutions, a natural history society with museum, an art association, musical societies, &c. The exports are chiefly the products of the country, such as grain, flour, cheese, lumber, &c., and there is a large trade in furs. The principal imports are cottons, woollens, and silks, iron and hardware, and tea and sugar. Among the industrial establishments of Montreal are iron foundries, distilleries, breweries, sugar-refineries, soap and candle works; and there are manufactures of cotton, silk, boots and shoes, paper, carpets, tobacco, hardware, edge-tools, floor-cloth, carriages, &c. The Grand Trunk Railway, which connects the railways of Canada with those of the United States, crosses the St. Lawrence at Montreal by the stupendous (tubular) Victoria Bridge, 9184 feet in length, constructed in 1854–59. Montreal was founded, under the name of Villemarie, in 1642, on the site of the Algonquin village Hochelaga. It came into the hands of the English in 1760, when it was taken from the French by Gen. Amherst. It was the seat of government of Lower Canada until 1849, in which year it was superseded by Quebec. Montreal returns three members to the Canadian House of Commons, and three also to the provincial legislature. The population in 1881 was 140,747, but since then several important municipalities have been annexed to the city, and the population is now, by census of 1891, 216,650, of which the majority are Roman Catholics and of French origin.

Montreal, an island of Canada, in the river St. Lawrence, at the confluence of Ottawa River, 32 miles long, and 10½ broad, containing the city of Montreal. The surface is generally level (with the exception of Mount Royal), and the soil is for the most part fertile and well cultivated.

Montrose', a seaport town in Forfarshire, Scotland, is situated 60 miles N.E. of Edinburgh, at the mouth of the South Esk, which widens out into a shallow expanse behind the town, known as Montrose Basin. The river is crossed by a suspension-bridge, and by a railway bridge. Between the town and the sea are extensive 'links.' Montrose is a well-built and fairly prosperous provincial town, with the usual public buildings and institutions, including two public libraries (one with 19,000 vols.) and one of the largest parish churches in Scotland. The principal employment is flax-spinning, employing about 2000 hands. Ship-building is also carried on, and there are extensive sawmills. The foreign trade, which is largely in timber, flax, &c., is chiefly with the Baltic and Canada. Montrose is also the centre of a fishery-district. It is one of the Montrose district of burghs, which includes Arbroath, Brechin, Forfar, and Bervie. Pop. 14,973.

Montrose, JAMES GRAHAM, MARQUIS OF (1612–1650), son of the 4th earl of Montrose, was born at Montrose in 1612, studied

James Graham, Marquis of Montrose.

at St. Andrews, and afterwards made a prolonged stay on the Continent. In 1637 Montrose joined the covenanters in their resistance to episcopacy, and was sent to crush the opposition to the popular cause which arose in and around Aberdeen. In 1639 he was one of the leaders who were appointed to confer with Charles I., after which he went over to the royalist side,

was created a marquis, and made commander of the royal forces in Scotland. With an army partly composed of Irish and Highlanders he gained in rapid succession the battles of Tippermuir and Bridge of Dee (1644), Inverlochy, Auldearn, Alford, and Kilsyth (1645). Deserted by his Highlanders, however, he was defeated at Philiphaugh by Leslie, and fled to Norway in 1646. In March 1650 he returned, landing in Orkney with a small body of followers. He failed, however, in raising an army, and a month later was surprised and captured in Ross-shire, and was conveyed to Edinburgh, where he was hanged and quartered 21st May, 1650.

Montserrat, one of the British West Indies, belonging to the Leeward group, lies about 30 miles N.W. of Antigua, and has an area of 32 square miles, mostly mountainous and barren. The principal exports are sugar and lime-juice. Its only town is Plymouth. Montserrat was discovered by Columbus in 1493, and was colonized by the British in 1632. Pop. 10,083, of whom not more than 200 are whites.

Monza, a town in N. Italy, 10 miles N.N.E. of Milan, is situated on the Lambro, which is here crossed by three bridges. The town is of great antiquity. Pop. 17,077.

Moody, DWIGHT L., evangelist, was born in Northfield, Mass., in 1837. At the age of 19 he engaged in missionary work. In 1873, accompanied by Sankey, visiting Europe, his services resulted in great religious awakenings. Week-day meetings have since been organized in the United States, attended by large audiences.

Moon, THE, one of the secondary planets and the satellite of the earth, revolves round the latter in an elliptic (almost circular) orbit, in one sidereal month (see *Month*), at a mean distance of 238,818 miles, her greatest and least distances being 252,948 and 221,593 miles. Her mean diameter is 2159 miles. Her surface is about $\frac{1}{13}$ (14,600,000 square miles) of that of the earth; her volume $\frac{1}{49}$; her mass about $\frac{1}{81}$; and her mean density a little more than $\frac{3}{5}$. A mass weighing 1 lb. on the earth's surface would weigh about 2·64 ozs. on the moon's surface. For every revolution in her orbit, the moon rotates once on her axis, so that the same portion of her surface is constantly turned towards the earth; but in virtue of an apparent oscillatory motion, known as libration (which see), about $\frac{4}{7}$ of her surface is presented at one time or another to terrestrial observers. If the moon's orbit were in the plane of the ecliptic, solar and lunar eclipses would occur monthly. Her orbit is, however, inclined 5° 8′ 48″ to the ecliptic, so that her meridian altitude has a range of 57°, and she occults in course of time every star within 5° 24′ 30″ of the ecliptic. An eclipse of the moon occurs when she passes into the earth's shadow; when she prevents the sun being seen there is an eclipse of the sun. (See *Eclipse*.) The changes in the appearance of the moon, described by the words waxing and waning, are known as *phases*. The four chief phases, occurring at intervals of 90° in the lunar orbit, are New Moon, when she is between the earth and sun (*i.e.* in conjunction with the sun), and so turns an unilluminated side to the earth; First Quarter, when one-half of her illuminated disc (*i.e.* one quarter of the entire lunar surface) is visible; Full Moon, when her whole illuminated disc is presented to the earth; and Last Quarter, when once more only half of her disc is visibly illuminated. Between new moon and full moon the moon is said to *wax;* on the rest of her course she *wanes*. When more than a semicircle is visible she is said to be *gibbous;* when new or full she is said to be in her *syzygies*. On the visible portion of the lunar surface there is either no atmosphere or an exceedingly rare one, and no traces of organic life have been observed. As each portion is alternately in sunlight and in shade for a fortnight at a time, and as no atmosphere has been detected, it is conjectured that the lunar extremes of heat and cold far exceed the greatest terrestrial extremes. The surface of the moon is mainly occupied by mountains, most of which are named after eminent scientific men. They are sometimes detached as precipitous peaks, more frequently they form vast continuous ranges, but the most prevalent form is that of crater-mountains, sometimes 8 to 10 miles in diameter, and giving evident traces of volcanic action. Certain crater-like formations, which have still greater diameters, are generally spoken of as 'walled plains.' Larger still are the 'gray plains,' which were at one time taken for seas, before the absence of water from the lunar surface was demonstrated. They may possibly be the floors of old seas. Some of the mountains have been estimated to be over 24,000 feet in height, from observation of their shadows. Very peculiar ridges of comparatively small elevation extend for great distances, connect-

ing different ranges or craters. The so-called 'rilles' or 'clefts' are huge straight furrows of great length (18 to 90 miles), now generally believed to be caused by cracks in a shrinking surface. There are also valleys of various sizes, and 'faults' or closed cracks, sometimes of considerable length. In reading descriptions of the visible peculiarities of the moon, it should be remembered that the highest telescopic power yet applied to that planet is only equivalent to bringing it within about 40 miles of the naked eye. The attraction of the sun for the earth and the moon tends to diminish their mutual action. When the moon is at new or full (in syzygies) the mutual attraction of the earth and moon is lessened by the sun more than usual, whereas it causes a small increase in the mutual action when the moon is in quadrature (when the line from the earth to the moon is at right angles to the line from the earth to the sun); again, the sun exerts a direct tangential acceleration on the moon which is positive (or towards the sun) when the moon is nearer the sun than the earth, and negative when the moon is further away than the earth; these two produce what is called the *moon's variation*, which, on the whole, is such that in each lunation the moon's velocity is greatest when she is in syzygies and least when nearly in quadrature. For the influence of the moon on tides see *Tides*.

Moon, MOUNTAINS OF THE, the name given, on the authority of Ptolemy, who thus designates the range in which he places the sources of the Nile, to a chain of mountains long supposed to extend across the whole African continent at its broadest part. In reality no such range exists, though there are numerous different mountain systems in that extensive region.

Moonstone. See *Adularia*.

Moore, JOHN, M.D., novelist and miscellaneous writer, was born at Stirling in 1730, and studied medicine at Glasgow University. He spent some time in the Netherlands, became house-surgeon to the British ambassador at Paris, afterwards practised in Glasgow, where he received the degree of M.D.; and from 1772–1778 was travelling physician to the ninth Duke of Hamilton. He then settled in London, but in 1792 accompanied Lord Lauderdale to Paris. He died at Richmond, in Surrey, in 1802. His best known work is his novel of Zeluco (1789), which exerted a considerable influence over Byron. Dr. Moore wrote two other novels and several volumes of observations made during his travels.

Moore, SIR JOHN, a celebrated British general, the son of the preceding, was born at Glasgow in 1761, killed at Corunna in 1809. Having obtained an ensign's commission in the 51st Regiment, he served at Minorca, in the American war, as brigadier-general in the West Indies (1795), in Ireland during the rebellion of 1798, in Holland in 1799, and in Egypt in 1801, where he was severely wounded in the battle which cost Sir Ralph Abercrombie his life. Moore was now regarded as the greatest living British general, and in 1805 he was knighted. In 1808 he was appointed commander-in-chief of the British army in Portugal to operate against Napoleon. He advanced to Salamanca in spite of the gravest difficulties, but was finally compelled to retreat to Corunna, a distance of 200 miles, in face of a superior force. This he accomplished in a masterly manner; but the absence of the fleet to receive his army forced him to a battle against Marshal Soult, in which Moore fell, mortally wounded, in the hour of victory (16th Jan. 1809).

Moore, THOMAS, the national poet of Ireland, was born in 1779 in Dublin, where his father was a grocer; died near Devizes in 1852.

Thomas Moore.

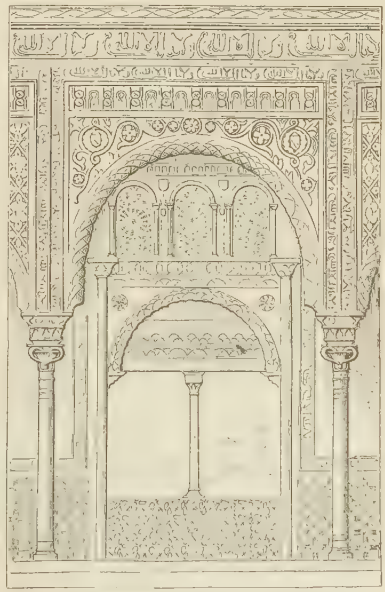
From Trinity College, Dublin, he passed in 1799 to the Middle Temple in London, nominally to study law; but he almost immediately formed a connection with the fashionable

and literary society of which he was so long an ornament, and in 1800 he was permitted to dedicate his Translation of the Odes of Anacreon to the Prince of Wales. His next venture, the Poetical Works of the late Thomas Little, though partly written in a licentious vein, which he afterwards regretted, increased his reputation; and in 1803 Lord Moira obtained for him the office of registrar of the admiralty court at Bermuda. Moore went out, but almost immediately appointed a deputy, and returned to England viâ the United States and Canada, and in 1806 published his Odes and Epistles. The severe castigation of this work by Francis Jeffrey in the Edinburgh Review led to a hostile meeting between the critic and the author, but the duel was interrupted by the authorities before a shot was fired. An allusion in English Bards and Scotch Reviewers, by Lord Byron, to a malicious report that the pistols on this occasion had been loaded only with powder, also produced a challenge from Moore, but matters were afterwards peaceably arranged. Both Jeffrey and Byron were subsequently among the warmest friends of Moore. In 1807 Moore agreed to write words for a number of Irish national airs, arranged by Sir John Stevenson. In these Irish Melodies, which were not finished till 1834, he found the work for which his genius was peculiarly fitted, and it is on them that his poetic reputation will mainly rest. With The Intercepted Letters, or the Twopenny Post Bag, by Thomas Brown the Younger (1812), Moore entered upon the field of political and social satire, in which his wit and playfulness found good account; other works of this kind are the Fudge Family in Paris (1818), Rhymes on the Road (1823), Memoirs of Captain Rock (1824), &c. His most ambitious work, the gorgeous Eastern romance of Lalla Rookh, was published in 1817, and brought its author £3000, but two years later he was compelled to retire to France in order to avoid arrest for a debt of £6000, afterwards reduced to about £1000, for which the dishonesty of his deputy at Bermuda had rendered him liable. He returned to England in 1822, with the poem The Loves of the Angels, and ultimately succeeded in paying the debt by his literary exertions. The Life of Sheridan was produced in 1825, and The Epicurean, a prose romance, in 1827. Next came the Life of Lord Byron, for which he received nearly £5000, and the Life of Lord Edward Fitzgerald. His remaining works include The Summer Fête, a poem; Travels of an Irish Gentleman in search of a Religion, a serious apology for Roman Catholicism; and (in 1834) a History of Ireland for Lardner's Cyclopædia, an uncongenial task-work, never finished. He wrote little after this. From 1835 he had enjoyed a pension of £300, and in 1850 his wife, whom he had married in 1811, received an additional annual grant of £100. Moore's Journal and Correspondence was published by his friend Lord John Russell in 1852–56.

Moor-fowl. See *Grouse.*

Moor-hen, or GALLINULE. See *Gallinule.*

Moorish Architecture, is that form of Saracenic architecture which was developed by the Moslem conquerors of Spain in building their mosques and palaces. Its main



Moorish Decoration—Court of the Alhambra.

characteristics are — the horse-shoe arch, varied by the trefoil, cinquefoil, and other forms of arch; profuse decoration of interiors by elaborately designed arabesques in low relief, enriched by colours and gilding, as well as by geometrical designs worked in mosaics of glazed tiles; the slenderness of the columns in proportion to the supported

weight; and the curious stalactitic pendentives by which the transition is effected from the rectangular ground plan to the arched or domed roof. An important specimen of this style is the mosque of Cordova, now the cathedral, which was begun by

Moorish Doorway, Cordova.

Caliph Abd-el-Rahman (786 A.D.), completed by his son, and subsequently much altered. It consisted originally of eleven aisles, and the eight aisles which were afterwards added (976–1001) made it one of the largest buildings in Europe, but the effect of its great extent, 420 feet by 375, is marred by its height, which is only about 30 feet to the roof. Another notable specimen of Moorish architecture is the Giralda or cathedral-tower of Seville. It is supposed to have been built by Abú Yusúf Yakúb (1171 A.D.) as a tower of victory, and was used by the Moslems as a minaret or mueddin-tower. The base is a square of about 50 feet, from which the tower rises straight for 185 feet, and is now crowned by a belfry added in the 16th century. The lower part of this tower is nearly plain, but from about one-third of its height upwards it is enriched by sunk panels filled with ornamentation in relief, which give lightness and grace to the structure without affecting its general massiveness. The most characteristic Moorish palace in existence is the Alhambra in Granada, an immense structure of simple and rather forbidding exterior, but within gorgeous almost beyond description. (See *Alhambra.*) In this palace are found to perfection the distinctive characteristics of Moorish architecture.

Moors, a Mohammedan, Arabic-speaking race of mixed descent, forming part of the population of Barbary, and deriving their name from the Mauri, the ancient inhabitants of Mauretania, whose pure lineal descendants are, however, the Amazirgh, a branch of the Berbers. The modern Moors have sprung from a union of the ancient inhabitants of this region with their Arab conquerors, who appeared in the 7th century. As the Mohammedan conquerors of the Visigoths in Spain (711–713) came from North Africa, the name Moor was also applied to them by Spanish chroniclers, and in that connection is synonymous with *Arab* and *Saracen.* These Moors pushed northwards into France, until their repulse by Charles Martel at the great battle of Tours in 732, after which they practically restricted themselves to Spain south of the Ebro and the Sierra Guadarrama. Here, for centuries, art, science, literature, and chivalry flourished amongst them, whilst the rest of Europe was still sunk in the gloom of the dark ages. Their internal dissensions and divisions, however, weakened them in face of the new Christian kingdoms of Aragon and Castile, and before the close of the 13th century their possessions were limited to the kingdom of Granada. This, too, was finally subdued by Ferdinand the Catholic in 1492; and while great numbers of the Moors emigrated to Africa, the remainder, under the name of *Moriscos*, assuming in great part a semblance of Christianity, submitted to the Spaniards. The cruel proselytizing zeal of Philip II., however, excited a sanguinary insurrection among the Moors in 1568-70, which was followed by the banishing of many thousands, while Philip III. completed the work in 1610 by finally expelling the last of these, the most ingenious and industrious of his subjects. Between 1492 and 1610 about 3,000,000 Moriscos are estimated to have left Spain. The expulsion of the Moors was one of the chief causes of the decadence of Spain; for both agriculture and industries fell into decay after their departure. The expelled Moors, settling in the north of Africa, founded cities from which to harass the Spanish coasts, and finally developed into the piratical states of Barbary, whose depredations were a source of irritation to the civilized Christian powers even till well into the present century.

Moorshedabad. See *Murshidabad.*

Mooruk (*Casuarius Bennettii*), a variety of cassowary, inhabiting the island of New Britain, where it is made a great pet with the natives. It is very swift of foot.

Moorva. Same as *Bowstring Hemp.*

Moose. See *Elk.*

Mora, a game known to the ancients, and still in vogue in the south of Europe. The two players simultaneously present each a hand, with some of the fingers extended, at the same moment endeavouring to guess the aggregate number of fingers so extended. An accurate guess counts one; five is game.

Moradabad, a town of India, in Rohilkhand, in the North-west Provinces, 75 miles east of Meerut, on the Ramganga. It is noted for its metal work, and is a centre of local trade. It was founded by the Rohilla Afghans, and has a Protestant church and American mission, and a cantonment. Pop. 67,387.—The district has an area of 2281 square miles. Pop. 1,155,173.

Moraine. See *Glaciers.*

Morales (mo-rä'lās), Luis De, a Spanish painter, surnamed *El Divino*, probably because he painted sacred subjects almost exclusively, was born at Badajoz in 1509, died there 1586. Invited to the court of Philip II., he lived for a short time at Madrid, and Philip latterly granted him a pension. His Mater Dolorosa, at Madrid, is considered his masterpiece. He is praised for his skilful gradation of tints, and his power of giving expression to resigned sorrow.

Morality, or Moral Play, a sort of allegorical play, embodying moral discourses in praise of virtue and condemnation of vice, the dialogue being carried on by personifications of virtues and abstract qualities. The Devil of the earlier Miracle Plays, which were never entirely superseded by the Moralities, became the Vice of the latter; sometimes he appears in person, with the Vice as his attendant. Moralities first appeared about the beginning of the reign of Henry VI., and lingered until the reign of Elizabeth (about 1600). Latterly they maintained their interest by reference to current topics, but finally gave way to regular drama.

Moral Philosophy. See *Ethics.*

Morat (mo-rä; German, *Murten*), a town (2364 inhabitants) in the Swiss canton of Freiburg, on the Lake of Morat, 16 miles west of Bern. Here, on the 22d of June, 1476, the Swiss Confederacy, aided by some allies from the Rhenish cities, routed with great slaughter Charles the Bold, duke of Burgundy,

Moratin', Leandro Fernandez, a Spanish writer of comedies, born in 1760 at Madrid, died at Paris in 1828. Moratin was the author of odes, sonnets, epistles, and other poems, as well as of five successful comedies, composed on the regular French models. He also wrote the valuable Origenes del Teatro Español.

Mora'va, the chief river of Moravia, a tributary of the Danube which it joins after a course of about 200 miles.

Moravia (German, *Mähren*), a north-western province or crownland of the Austrian Empire, area 8578 square miles. It is inclosed by the Carpathians and other mountains, and belongs almost entirely to the basin of the March or Morava (from which it takes its name), a tributary of the Danube. The minerals are of considerable importance, and include iron, coal, graphite, and slate. Nearly 97 per cent of the soil is productive, the chief crops being rye, oats, barley, potatoes, beet-root, and flax. Fruit is very abundant, and large quantities of wine are annually produced. Sheep in great numbers, and cattle, are reared. Moravia is the most important manufacturing province of the empire, after Austria Proper and Bohemia. Its woollen industries are of world-wide fame, and linen and cotton, beetroot-sugar, iron and steel goods, machinery, beer, and spirits are also turned out in large quantities. The chief towns are Brünn, Olmütz, Znaim, and Iglau. In 1029 Moravia was united to the Kingdom of Bohemia, with which it passed to Austria in 1526. Moravia possesses a provincial diet with 100 members, and sends 36 deputies to the imperial diets. About 70 per cent of the inhabitants are Slavonians (Czechs) and nearly 30 per cent Germans; total pop. 1891, 2,276,870.

Moravian Brethren, also called United Brethren, Herrnhuter, and officially Unitas Fratrum (Unity of Brethren), a Protestant sect or church which originally sprang up in Bohemia after the death of John Huss. (See *Bohemian Brethren.*) After the sanguinary religious wars which prevailed in Bohemia until 1627 they were everywhere almost annihilated. Their doctrines were still, however, secretly cherished in Moravia, and in 1722 a colony emigrated thence, and were invited by the Lutheran Count Zinzendorf to settle on his estate near Berthelsdorf, in Saxony, where they built the town of Herrnhut, still the head-quarters of the church. The doctrines of the brethren had hitherto been more in harmony with the

Calvinistic than with the Lutheran form of Protestantism, but under the influence of Count Zinzendorf, who himself became a bishop, they attached themselves to the Lutheran Church. From Herrnhut the Moravian Church extended to other points in Germany, and to England and the United States (1735). These three countries form self-supporting home-provinces of the Unitas, to which in 1889 the West Indies, hitherto a mission-field, was added as a fourth. Each has its synod and elders' conference, subject to the General Synod, which meets at Herrnhut once every 7–12 years. The Moravian Brethren have always distinguished themselves as missionaries, and maintain stations in North and Central America, South Africa, Australia, and Tibet. The Moravian Brethren are distinguished for the Puritanical simplicity of their life and manners, and for their earnest, if somewhat narrow and austere, piety. The practice of living in exclusive communities or villages still obtains in Germany. Within these communities the unmarried men sometimes live in common in a building assigned for that end, the unmarried women in another, widows in a third. Moravian schools deservedly enjoy a high reputation even among those who are not members of the community. The clergy are divided into bishops, priests, and deacons. The Moravian church is estimated to number about 115,000 adherents. In the U. States, in 1890, there were 11,781 members.

Mora-wood. Same as *Fustic.*

Moray. See *Elgin.*

Moray Firth, the great gulf on the north-east coast of Scotland, containing at its widest extent the sea between Duncansby Head in Caithness-shire and Kinnaird Head in Aberdeenshire, a distance of 78 miles; but in a restricted sense that portion which lies between Tarbat Ness and Lossiemouth (21 miles), and which extends into the Cromarty and Beauly Firths.

Moray, or MURRAY, JAMES STUART, EARL OF, half-brother of Mary Queen of Scots, natural son of James V. of Scotland and Margaret Erskine, born about 1533. In 1558 he joined the Lords of the Congregation, and was soon recognized as the head of the reformers' party. On Mary's return from France Moray became her favoured adviser, but her marriage with Darnley and subsequent events caused a breach between them which constantly widened. On the deposition of Mary he was appointed regent, defeated her forces at Langside on her escape from Lochleven (1568), and appeared as evidence against her at her trial in England. He consequently incurred the bitter hatred of the queen's party, but earned from the people the title of 'Good Regent.' In 1570 he was shot in the streets of Linlithgow by Hamilton of Bothwellhaugh, who was actuated by private grievances.

Morayshire. See *Elgin.*

Morbihan (mor-bi-äṅ), a north-western department of France, on the Bay of Biscay; area, 2624 square miles, of which less than half is arable. The northern part is hilly, but the rest is low and level, especially along the coast, which is lined by several fertile islands and is deeply indented. The plains on the coast are fertile, and the ordinary fruits are abundant; cider, butter, and honey are among the chief products. The fisheries are important, and the general trade, favoured by the harbours on the coast and by canals, is considerable. Iron is the chief mineral. The chief town is Vannes. Pop. 1891, 544,470.

Mordant, a substance frequently employed to fix the colours in dyeing. See *Dyeing.*

Mordaunt, CHARLES. See *Peterborough, Earl of.*

Mordvins, a race of people inhabiting European Russia, and belonging to the Bulgaric or Volgaic group of the Finnish family of peoples. They are found chiefly in the governments of Penza, Simbirsk, Saratov, Samara, Nishegorod, and Tambov. Their chief sources of livelihood are cattle-rearing, hunting, fishing, and bee-keeping. Their numbers are estimated at 480,000.

More, HANNAH, popular writer on moral and religious subjects, born at Clifton, Bristol, about 1745; died there, 1833. Her talents early made her acquainted with Johnson, Burke, Garrick, and other literary men, and her plays, The Inflexible Captive, Percy, and the Fatal Captive, were fairly successful. After the production of the last in 1779 she devoted herself to the composition of works having a moral and religious tendency, the diffusion of tracts, and philanthropic labours. Her success was astonishing, the profits of her works during her lifetime exceeding £30,000. Her Strictures on the Modern System of Female Education, Cœlebs in Search of a Wife, Practical Piety, and Moral Sketches, are among her best-known books.

More, HENRY, D.D., a divine and philosopher, born at Grantham, in Lincolnshire,

in 1614; died at Cambridge, 1687. He studied at Eton, and graduated at Christ College, Cambridge, in 1639. In the following year he published his Psycho-Zoia, or the First Part of the Song of the Soul, a blending of Christian, Cabbalist, and Platonic doctrines. In 1675 he accepted a prebend in the cathedral of Gloucester, which it is supposed he took only to resign it to his friend Dr. Fowler. He also gave up his rectory of Ingoldsby, in Lincolnshire. In 1661 he became a fellow of the Royal Society. His writings are characterized by the belief that Plato had received through Pythagoras a knowledge of Hebrew theology and was also favoured directly with supernatural communications. The most admired are his Enchiridion Ethicum (1669) and Divine Dialogues concerning the Attributes and Providence of God.

More, Sir Thomas, a Chancellor of England, only son of Sir John More, a judge of the Court of King's-bench; born in London in 1480, beheaded 1535. A portion of his youth was spent in the family of Cardinal Morton, archbishop of Canterbury, and chancellor; and he was then sent to Oxford, and afterwards entered at Lincoln's Inn. He had already formed an intimate and lasting friendship with Erasmus. About 1502 he became a member of parliament, and immediately made for himself a place in history by upholding the privileges of the House of Commons to treat all questions of supply as their own exclusive business. On the accession of Henry VIII. he was made under-sheriff of London. In 1514 he was envoy to the Low Countries, soon after was made a privy-councillor, and in 1521 was knighted. He appears to have ere this time considerably enriched himself by practice, and with his wife, a daughter of a gentleman of Essex named Colt, he kept up a noble hospitality. In 1523 he became speaker of the House of Commons, and in 1529 succeeded Wolsey in the chancellorship. When Henry began his attacks on the papal supremacy More at once took up the position which his conscience dictated as a supporter of the old system. Henry marked him out for vengeance as an opponent of his matrimonial views, and More endeavoured to shield himself by retiring from office. He was requested to take the oath to maintain the lawfulness of the marriage with Anne Boleyn. His refusal to do so led to his committal to the Tower, trial for misprision of treason, and execution. His chief work is the Utopia (in Latin), a philosophical romance describing an ideal commonwealth, which evinces an enlightenment of sentiment far beyond that of his time.

More'a. See *Greece.*

Moreau (mo-rō), Jean Victor, French general, born at Morlaix, in Bretagne, in 1763, died 1813. Bred to the law he early displayed a predilection for the military profession, and in 1789 he joined the army of the north at the head of a battalion of volunteers. He so distinguished himself that he was named commander-in-chief of the army of the Rhine and Moselle in 1796, destined to threaten Vienna simultaneously with the invasion of Italy by Bonaparte. His conduct of the operations, and especially of the retreat to the French frontier in the face of a superior army, showed exceptional strategic power. In 1799 he was in command of the army of Italy, and next year had the command of the armies of the Danube and the Rhine. The passage of these rivers, and a series of victories, ending with Hohenlinden, induced the Austrians to ask for peace. Being found guilty of participation in the conspiracy of Pichegru and Cadoudal against Napoleon (1804), he had to go into exile, and purchased an estate in Pennsylvania, where he resided some years. He was subsequently induced to aid in the direction of the allied armies against his own country, but was mortally wounded in the battle before Dresden in 1813, and died a few days later.

Morecambe Bay (mōr'kam), a bay on the north-west coast of England, running into Lancashire and Westmoreland. It is very shallow, and proposals to reclaim the greater portion of it have been frequently made.

Moreen', a woollen or woollen and cotton fabric made in imitation of moiré (that is, having a watered appearance), and used for curtains, dresses, &c.

Mo'rel, a genus of edible mushrooms (*Morchella*), applied specifically to *Morchella esculenta.* This is plentiful in some parts of Britain, and common in Germany. It is much used to flavour gravies, and is sometimes employed instead of the common mushroom to make ketchup.

More'lia, a town of Mexico, capital of the state of Michoacan, in a valley 6400 feet above sea-level. It enjoys a mild and salubrious climate, is well built, has a cathedral, several elegant churches, and fine promenades. Pop. 1890, 26,974.

Morel'lo, a fine variety of cherry with fruit that becomes almost black if allowed to hang.

More'los, an inland state of Mexico, south of Mexico, containing the volcano of Popocatepetl; area, 2773 sq. miles; pop. 141,565.

Moresques, in painting. See *Arabesques.*

Moreton Bay, the port of Brisbane, the capital of Queensland. It is about 40 miles long N. and S. by 17 miles wide, and receives the waters of the Brisbane and other rivers. The anchorage is good.

Moreton Bay Chestnut (*Castanospermum austrāle*), a leguminous tree of Australia, with pea-like yellow flowers and edible seeds somewhat resembling chestnuts.

Moreton Bay Pine. See *Araucaria.*

Moreto y Cabaña (mo-rā'tō ē kä-bän'yä), Agustin, Spanish dramatist, born at Madrid in 1618. He studied at Alcala (1634–39), entered the household of the Cardinal Archbishop at Toledo, took holy orders, ultimately withdrew from the world to an ascetic religious brotherhood, and died in 1669. He was a friend and largely an imitator of Lope de Vega and Calderon, but by his developments on the humorous side is sometimes regarded as the founder of true comedy in Spain. He left more than 200 works, one of which, El Desden con el Desden (Scorn for Scorn), is classed in the four most perfect products of the Spanish drama.

Morgan, Sydney, Lady, authoress and brilliant society figure, born somewhere between 1770 and 1786, the actual date having been whimsically concealed by her. Her father was an actor on the Dublin stage, named MacOwen or Owenson. She early attracted attention by her musical and other accomplishments. In 1797 she published a volume of poems, followed by a collection of Irish songs, and two novels, entitled St. Clair, and the Novice of St. Dominick. In 1806 appeared her Wild Irish Girl, a novel which passed through seven editions in two years. In 1811 she married Sir Charles Morgan, an eminent physician. Among her other writings are the novels of O'Donnell, Florence Macarthy, and the O'Briens and the O'Flahertys; the Life and Times of Salvator Rosa; Woman and her Master; and Passages from my Autobiography. She died in 1859.

Morganat'ic Marriage, in some European countries, one in which it is stipulated that the wife (who is inferior in birth to the husband) and her children shall not enjoy the privileges of his rank nor inherit his possessions. The common law of Germany permits such marriages only to the high nobility.

Morgarten, a place in Switzerland, Canton Zug, where a small body of Swiss in 1315 totally defeated a large force of the Austrians.

Morghen, Raphael Sanzio, Italian engraver, born in 1758. He studied at Rome under Volpato, whom he assisted in engraving the famous pictures by Raphael in the Vatican. He settled in Florence in 1793 as professor of engraving in the Academy of Arts, and died in 1833. His works number about 200 in all, many of them of large size. Among the chief are: the engraving of Leonardo da Vinci's Last Supper; the Transfiguration, after Raphael; a Magdalen, after Murillo; a Head of the Saviour, after Da Vinci; the Car of Aurora, after Guido; The Hours, after Poussin; the Prize of Diana, after Domenichino; the Monument of Clement XIII., after Canova; Theseus vanquishing the Minotaur; portraits of Dante, Petrarca, Ariosto, Tasso, &c.

Morgue (morg), La, in Paris, a place behind Notre-Dame, where the bodies of unknown persons who have perished by accident, murder, or suicide are exposed, that they may be recognized by their friends.

Morier, James, English novelist, born in 1780. He accompanied Lord Elgin as private secretary on his embassy to Constantinople, made the campaign of Egypt in the suite of the grand-vizier, was taken prisoner by the French, and after his release became from 1810 to 1816 British envoy at the court of Persia. He died at Brighton in 1849. In 1812 and in 1818 he published accounts of two Journeys through Persia to Constantinople, but he was best known by his Adventures of Hajji Baba of Ispahan (1824); Adventures of Hajji Baba in England (1828); Zohrab the Hostage (1832); Ayesha the Maid of Kars (1834).

Morin'da, a genus of Asiatic trees of the cinchona family, the bark or roots of which yield red and yellow dyes.

Moringa'ceæ, a natural order of plants, closely akin to Leguminosæ and containing only the genus *Moringa.* See *Ben.*

Morion of the time of Queen Elizabeth.

Mor'ion, a helmet of iron, steel, or brass, somewhat like a hat in shape, often with a crest or comb over the top, and without

beaver or visor, introduced into Britain from France or Spain about the beginning of the 16th century.

Morisco. See *Moors.*

Morisonians. See *Evangelical Union.*

Moritz. See *Maurice of Nassau.*

Morlaix (morlā), a seaport of France, department of Finistère, 34 miles north-east of Brest, on a small estuary formed by the junction of two streams, with a government tobacco factory, and a good trade. Pop. 12,832.

Morland, George, painter, born in London 1763, died 1804. He married a sister of James Ward the animal painter, and William Ward the engraver, and lived a very dissipated life, many of his best pictures being painted within the rules of a debtor's prison. His work deals with rustic and homely life, and the best of it is now highly prized by connoisseurs. He had extraordinary popularity during his lifetime, and about 250 of his pictures are said to have been engraved. The Interior of a Stable now in the National Gallery is perhaps his masterpiece.

Morley, Henry, LL.D., born in London 1822; educated at King's College, of which he is an honorary fellow; practised medicine in Shropshire and teaching in Liverpool; and came to London as a journalist in 1851. From 1857 to 1865 he was English lecturer at King's College; since the latter year he has been professor of English language and literature at University College, London, and also at Queen's College. In 1882 he became principal of University Hall. His more important works are connected with the history of English literature, and include First Sketch of English Literature, English Writers, English Literature in the Reign of Victoria, &c. He has edited various series of literary works, besides writing many biographies, two vols. of Fairy Tales, &c.

Morley, John, author and politician, born at Blackburn, Lancashire, 1838; educated at Cheltenham and at Lincoln College, Oxford, where he graduated B.A. in 1859. He was called to the bar in 1873; was for some time editor of the Literary Gazette, conducted the Fortnightly Review from 1867 to 1882, and edited the Pall Mall Gazette for three years (1880–83), and Macmillan's Magazine for two years (1883–85). He is editor also of the English Men of Letters series, to which he contributed the volume on Burke. He is author of a Life of Cobden, an Essay on Wordsworth, Walpole in the English Statesman series, &c. He was an unsuccessful candidate for the representation of Blackburn in 1869, and Westminster in 1880, but succeeded at Newcastle-on-Tyne in 1883. Radical in politics, he has been one of Gladstone's chief supporters in his Home Rule scheme, and filled the office of chief secretary for Ireland for a short time in 1886; reappointed in 1892.

Mormaer. See *Maormor.*

Mormons, a sect founded in 1830 by Joseph Smith, a native of the United States. The distinguishing peculiarities of the sect are—the belief in a continual divine revelation through the inspired medium of the prophet at the head of their church, the practice of polygamy, and a complete hierarchical organization. The supreme power, spiritual and temporal, rests with the president or prophet (elected by the whole body of the church), who alone works miracles and receives revelations. The Mormons accept both the Bible and the Book of Mormon as divine revelations, but hold them equally subject to the explanation and correction of the prophet. The latter mentioned book (in large part a kind of historical romance written by one Solomon Spaulding in 1812) pretends to be a history of America from the first settlement of the continent after the destruction of the tower of Babel up to the end of the 4th century of our era, at which time flourished the legendary prophet Mormon, its reputed author. It was said to have been written on gold plates, and concealed until its hiding-place was revealed to Smith by an angel. The name given to it was evidently owing to the important part which Spaulding had assigned to Mormon and his son Moroni in his novel; but Smith and his coadjutors, instead of confining themselves to the original manuscript, had clumsily engrafted upon it a number of maxims, prophecies, &c., evidently garbled from the sacred volume, and interpolated in such a manner as to involve anachronisms and contradictions. The doctrine of the Mormons is a mixture of materialism and millenarianism, and their most distinctive feature, polygamy, which, though originally condemned in the Book of Mormon, was introduced under a theory of 'spiritual wives,' and a mysterious system of unrestricted marriage called 'sealing.' The Mormons first appeared at Manchester, New York, whence they were compelled by the persevering hostility of their neighbours to

flee, first to Kirtland in Ohio (1831), then to Nauvoo, the 'City of Beauty,' in Illinois (1838), and finally to the Salt Lake in Utah (1848). In 1844 the founder, Joseph Smith, was shot by a mob in Carthage prison, where his lawless behaviour had brought him. The advance made by Mormonism seems to have been due far more to the abilities of Brigham Young, the successor of Smith, than to the founder himself, who was little better than a dissipated and immoral scamp. Under Young's direction large tracts of land at Salt Lake were brought under cultivation, an emigration fund was established, and a skilful system of propagandism set on foot, by which large numbers of converts were brought from Europe, especially from Great Britain. A state was organized under the name of Deseret. Congress refused to recognize it, but erected Utah into a territory, and Brigham Young was appointed governor of it. He was soon removed by the United States authorities, but after a time the Mormons were left pretty much to themselves. In 1870 Congress passed a bill to compel them to renounce polygamy, or quit the United States. A prosecution was instituted against Brigham Young, who was sentenced to fine and imprisonment. In 1877 Young died and was succeeded by John Taylor, an Englishman, during whose presidency the United States government has passed several bills for the abolition of polygamy. The church (1890) had 144,352 members in the U. States. *The Reorganized Church of Jesus Christ of Latter-Day Saints*, sometimes called Nonpolygamous Mormons, claim to be true to the doctrines proclaimed by Joseph Smith, insisting that Brigham Young's followers were led by him from the truth, and deny that Young's revelation in 1852 concerning polygamy was genuine. Membership (1890) 21,773.

Morning-star, the planet Venus when it rises before the sun.

Morny, CHARLES AUGUSTE LOUIS JOSEPH, COMTE DE, French politician, said to have been a half-brother of Louis Napoleon, born at Paris 1811, died 1865. He was for a time in the army, then tried commercial speculation, and finally politics. He took a prominent part in the *coup d'etat* of 1851, and was a prominent figure under the second empire.

Morocco, or MAROCCO (Arabic name, *Moghreb-el-aksa*, the Extreme West), an empire or sultanate occupying the north-west extremity of Africa, bounded by the Atlantic Ocean, the Mediterranean, Algeria, and the desert; area, about 300,000 square miles. Its most remarkable natural feature is Mount Atlas, the great chain or series of chains extending through it from north-east to south-west, and reaching a height of 12,000 or 13,000 feet. Between the mountains and the sea are table-lands and plains, some of them of great fertility. The rivers are unimportant, being mostly dry for part of the year, and generally diminishing in volume as they approach the sea. The coast offers few good harbours; the most frequented are Tangier, El-Araish (Laraiche), Rabat, and Mogador. The climate in many parts is pleasant and temperate, in many others the summer heat is insufferable. The minerals include gold, silver, copper, iron, and lead in larger or smaller quantities. The flora includes the esculent oak and cork oak; in the higher regions of the Atlas the cedar and Aleppo pine; the date-palm and the dwarf-palm east and south of the Atlas. Agriculture is in the lowest possible condition, and the annual production is calculated barely to supply the wants of the country. The cereal crops include wheat, barley, and maize; but dhurra or millet constitutes the chief support of the population. The vine is cultivated only near towns for the sake of the fresh grapes and for the raisins. All the fruits of the south of Europe are cultivated to some extent. Among the wild animals are the lion, panther, jackal, hyena, wild boar, gazelle, and several species of large antelope. The locust is a cause of much devastation. The ostrich is found on the southern frontiers. Cattle and sheep are reared, and the spirited small horses for which the country was once famous are still numerous. There are large numbers of goats, which furnish a principal article of export—the well-known Morocco leather. In general, among the rural population, each family supplies all its own wants. In the towns, however, some manufactures have sprung up, besides the well-known leather. Fez makes and exports the cloth caps which bear its name. Carpets, embroidered stuffs, pottery, arms, are also made. The trade is carried on by caravan with the interior, or by sea with European states, especially with Great Britain, next to which comes France. The Berbers are the oldest inhabitants of the country, and they devote themselves to agriculture rather than to pastoral pursuits. The Arabs form the bulk of the rural popu-

lation in the plains; some of them are cultivators, and others are Bedawín. In the towns along the coast are found the Moors, and a considerable number of Jews inhabit all the commercial towns. To these must be added the negroes and their posterity of every shade. The civilization of Morocco has sunk to a low condition. The education at the schools and at the University of Fez does not go beyond the theology of the Koran. The public libraries, once famous, are now dispersed. Morality is represented as being in a deplorable state. The sovereign or sultan, styled by Europeans emperor, is absolute in the strictest sense. The imperial revenues (about £500,000 per annum) are derived from arbitrary imposts on property, duties on imports and exports, monopolies, and fines or confiscations. The military force maintained by the sultan does not ordinarily exceed 25,000. The marine force is insignificant. The chief towns are Morocco and Fez, the one in the south-west, the other towards the north-east.—Morocco in ancient times formed part of Mauritania, and about 43 A.D. was incorporated in the Roman Empire. In the latter part of the 7th century the Arabs spread over North Africa, and took possession of Mauritania. Among ruling dynasties since then have been the Almoravides, Almohades, and others. The present dynasty, the ninth, was founded in 1648. In 1814 the slavery of Christians was abolished, and piracy was prohibited in 1817. The conquest of Algeria brought about complications with France, and the plundering of vessels by pirates has often caused troubles with European powers. In 1893 a war broke out with Spain, in which the tribes known colloquially as the Riffians displayed foolhardy bravery and religious fanaticism. They were severely defeated by the Spaniards. The population of Morocco is about 6,500,000.

Morocco, the capital (conjunctly with Fez) of Morocco, lies in the south-west of the country, on an extensive and fertile plain, 1500 feet above sea-level. It is nearly 6 miles in circuit, and is walled, though its walls and towers are in a ruinous condition. The streets are unpaved, dirty, narrow, and irregular. There are several open areas used as market-places, a covered bazaar, and many mosques. Near the palace, which is on the south of the city, is the Jews' quarter (El Millah), a walled inclosure of about 1½ mile in circuit, one-half of it nearly in ruins, very crowded, and excessively filthy. There are several tanning and leather-dyeing establishments. Pop. estimated at 40,000 to 50,000.

Morocco, a fine kind of leather made from the skins of goats, imported from the Levant, Barbary, Spain, Belgium, &c., tanned with sumach, dyed, and grained, the last process being that which gives it its well-known wrinkled appearance. It is extensively used in the binding of books, upholstering furniture, making ladies' shoes, &c. Imitation moroccos are made from sheep-skins, so perfect in appearance that it is difficult to distinguish them, but they are entirely lacking in the durability of the real article. The art of preparing morocco is said to have been derived from the Moors.

Moron', a town of Spain, in Andalusia, 32 miles north-east of Seville. It has a fine church, and the ruins of a castle, long one of the most important strongholds of Spain, blown up by the French in 1812. Pop. 14,879.

Moroxite, the crystallized form of apatite, occurring in crystals of a brownish or greenish-blue colour.

Morpeth, a municipal and parl. borough in England, Northumberland, on the Wansbeck, 14 miles north by west of Newcastle. It has a fine old parish church in the decorated English style. Its manufactures are inconsiderable, but there are large collieries in the vicinity. It returns one member to parliament. Pop. of mun. bor. 5219; of parl. bor. 1891, 40,133.

Morpheus (mor'fūs), in Greek mythology, the son of Sleep and god of dreams.

Mor'phia, MORPHINE, the narcotic principle of opium, a vegetable alkaloid of a bitter taste, first separated from opium in 1816. It forms when crystallized from alcohol brilliant colourless prisms of adamantine lustre. As it is very slightly soluble in water, it is never used alone medicinally, but it readily combines with acids forming salts extensively used in medicine. In small doses it is powerfully anodyne; in large doses it causes death, with narcotic symptoms. It is very commonly administered medicinally by subcutaneous or hypodermic injection, and the practice of injecting morphia has become a not infrequent vice, leading to a diseased mental state known as *morphinomania*.

Morphology, a branch both of zoology and botany which deals with the structure and *form* of animals and plants respectively and their different organs, from those of the

lowest to those of the highest type. In morphology questions of *homology* and *analogy* (see *Homologous, Analogue*) are of the greatest importance, and morphology may be said to lie at the foundation of all true systems of classification and arrangement.

Morris, LEWIS, English poet, born near Caermarthen, Wales, 1834; educated at Oxford, where he graduated first class in classics in 1855. He was called to the bar in 1861. His poems have been widely popular, many of them running through numerous editions. His Jubilee Ode was recognized by a silver medal from her Majesty.

Morris, RICHARD, LL. D., English scholar, born in London 1833. He was educated at Battersea College; became lecturer on English language and literature at King's College School in 1869; took holy orders, and became curate of Christ Church, Camberwell, in 1871, and headmaster of the Royal Masonic Institution for boys in 1875. He has done excellent service to the national study of English.

Morris, ROBERT, signer of the Declaration of Independence, was born in England in 1734. In 1775 was delegate to the Continental Congress. To the government he gave the full benefit of his credit; in 1780 raising $1,400,000 to assist Washington, and organizing the Bank of North America. In 1787 was member of the Convention that framed the U. S. Constitution; afterwards member of the first U. S. Senate. He was offered the post of Secretary of the Treasury, which he declined. He died in 1806.

Morris, WILLIAM, English poet, art writer, &c., born in 1834. His artistic bent prompted him to embark in the designing and manufacture of high-class decorations for house interiors. This venture turned out a successful business speculation, and has had a material effect in improving the style of design employed for decorative textiles, wall-papers, &c. Morris published an epic poem, Jason, in 1867, The Earthly Paradise in 1868–70, Love is Enough in 1873, Sigurd the Volsung in 1877, &c. He has translated various Scandinavian works, translated Virgil's Æneid and Homer's Odyssey into English verse, and published several lectures on art. He is a leader of the socialistic movement in Britain.

Morris-dance (that is, *Moorish-dance*), a dance supposed to have been derived from the Moriscos in Spain, formerly danced at puppet-shows, May-games, &c., in England. Bells were fastened to the feet of the performers, which jingled in time with the music, while the dancers clashed their staves or swords. In the reigns of Henry VII. and VIII. it was a principal feature in the popular festivals.

Morrison, ROBERT, D.D., English missionary and orientalist, born 1782, died 1834. In 1807 he went out as a missionary for Canton. In 1814, having completed the issue of the New Testament in Chinese, he commenced, with the assistance of Dr. Milne, who had joined him in 1813, the translation of the Old Testament. He was also the author of a Chinese grammar and dictionary.

Morristown, Morris co., N. J., 31 m. w. by N. from New York, is a favourite summer residence for citizens of New York. During the Revolutionary war it was twice the headquarters of the American army. Pop. 1890, 8156.

Morse, SAMUEL FINLEY BREESE, inventor of the electro-magnet telegraph in its first practicable form; born at Charlestown,

Samuel Morse.

Mass., 1791; died at New York, 1872. He was educated at Yale College, where he devoted special attention to chemistry and natural philosophy; but in 1811 went to England to study painting under West. In 1813 he was awarded the gold medal of the Royal Academy for his model of the Dying Hercules. Returning to the United States in 1815, he continued painting, and in 1826 succeeded in establishing the 'National Academy of Design,' of which he was first president. In 1829 he went to Europe for

three years, and during the return voyage worked out roughly a plan for employing electro-magnetism in telegraphy. It was not until 1835, however, that he was able to exhibit an instrument that was found to work well. By July 1837 this instrument was perfected, and ultimately in 1843 Congress granted him means to construct an experimental line between Washington and Baltimore. From that time Morse's instrument came into general use in America and Europe. In 1857 the representatives of ten countries met at Paris, and voted him 400,000 francs.

Morse's Telegraph. See *Telegraph.*

Morshansk', a town of Central Russia, government of Tambov, a great centre of trade. Pop. 21,190.

Mortality, Law of, the statement of the average proportion of the number of persons who die in any assigned period of life or interval of age, out of a given number who enter upon the same interval, and consequently the proportion of those who survive. Tables showing how many out of a certain number of infants, or persons of a given age, will die successively in each year till the whole become extinct, are generally called tables of mortality. In England the bills of mortality, or abstracts from parish registers, were long the only means of arriving at these results; but being found very imperfect and unsatisfactory, they were supplanted in 1836 by a general registration. The registers, if kept with accuracy and minuteness, enable us to determine the proportion of deaths, not only at different ages and in different regions, but at different seasons, in persons of different occupations and habits, in towns, or the country; and thus afford valuable materials for the science of political economy. The average rate of mortality is affected by regular or constant causes, such as race, climate, age, sex, profession, social position, density of population, political institutions, habits, &c., and by such irregular or occasional causes as war, famine, pestilence, &c., but notwithstanding the interruption of these occasional causes a constant tendency to a mean has been found to exist in any given state of society. The tendency of a population to increase depends rather on the facility of procuring the means of subsistence than on the rate of mortality.

Mortar, a mixture of sand with slaked lime and water, used as a cement for uniting stones and bricks in walls. The proportions vary from 1½ part of sand and 1 part of lime to 4 or 5 parts sand and 1 of lime. When exposed to the action of the air this mixture absorbs carbon dioxide and 'sets,' forming a hard, compact mass. *Hydraulic mortars,* which harden under water, and are used for piers, submerged walls, &c., are formed from so-called *hydraulic lime,* containing considerable portions of silica and alumina. See also *Cement.*

Mortar is a kind of short cannon, of a large bore, with a chamber, used especially for throwing shells. The fire from mortars is what is termed vertical fire, the mortar being directed at a high angle and the shell striking the ground nearly vertically. The principal recommendations of vertical fire are, that the shells search behind cover and produce a great moral effect, also that at high elevations a great range is obtained with a comparatively small charge of powder.

Mortgage, in law, the conveyance of an estate, real or personal, by a debtor to his creditor, as a pledge or security for a debt. The debtor is called the mortgagor, the creditor mortgagee. The conveyance is absolute in form, but subject to a proviso by which it is to become void, or by which the pledge is to be reconveyed upon repayment to the grantee of the principal sum secured, with interest, on a certain fixed day. Upon the non-performance of this condition the mortgagee's estate becomes absolute at law, but remains redeemable in equity during a limited period. In general, every description of property, and every kind of interest in which it is capable of absolute sale, may be the subject of a legal mortgage. A mortgagee is not allowed to obtain any advantage out of the security beyond his principal and interest. Though the mortgagee, after the mortgagor's default in payment of the principal sum and interest, has the absolute legal estate, he is still considered in equity to hold only as a security for his debt. In order to obtain absolute possession of the estate, the mortgagee has to file a bill of foreclosure against the mortgagor, calling upon the latter to redeem his estate forthwith, by payment of the principal money, interest and costs; and if he fail to do so within the time specified by the court he is forever barred and foreclosed of his equity of redemption, and the mortgagee becomes owner in equity, as he before was in law. In the event of a sale any surplus must be paid to the mortgagor.

Mortification, in medicine, is the death of a part of the body while the rest continues alive, and often in a sound state. Mortification is a popular term, the scientific term being *gangrene* or *necrosis*, the former usually applied to the death of soft parts, the latter to the death of bone. Mortification is generally induced by inflammation, by exposure to freezing cold, by hospital fevers, by languid, or impeded, or stopped circulation, as in cases of bedridden or palsied persons, and by improper food, particularly the spurred rye.

Mortmain (Fr. *mort*, dead, *main*, hand), in law, possession of lands or tenements in dead hands, or hands that cannot alienate, as those of a corporation. *Alienation in mortmain* is an alienation of lands or tenements to any corporation, sole or aggregate, ecclesiastical or temporal, particularly to religious houses. Such conveyances were forbidden by Magna Charta.

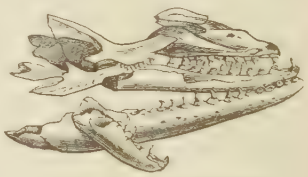
Morton, Levi Parsons, Vice-President of the United States, was born in Shoreham, Vermont, in 1824. In 1878 was elected to Congress; re-elected in 1880; and from 1881 to 1885 minister to France. In 1888 was elected Vice-President.

Mosaic, a term applied to a kind of inlaid work formed by an assemblage of little pieces of enamel, glass, marble, precious stones, &c., of various colours, cut, and disposed on a ground of cement in such a manner as to form designs, and to imitate the colours and gradations of painting. This kind of work was used in ancient times both for pavements and wall decoration, while in modern times paintings are by this means copied, and the art is also used in pavements, jewelry, &c. The most remarkable modern works of this kind have been executed by Roman, Venetian, and Russian artists, those of the Roman school being the most celebrated, and consisting in particular of a series of portraits of the popes, and copies of notable paintings by the great artists, such as Raffaele, Domenichino, Guido, &c. For the production of these works rods of opaque coloured glass are employed, an immense variety of colours and shades being used. Pieces are cut from the ends of these rods, according to the colour required, and are arranged side by side, their lower ends being attached by the cement while their upper ends show the design. From such works, when on a small scale, sections may be cut across, each section exhibiting the pattern,

Mosaic Gold, an alloy of copper and zinc, called also *ormolu* (which see); also a sulphide of tin, the *aurum musivum* of the ancients.

Mosaic Wool-work, rugs, &c., made of variously-coloured woollen threads, arranged so that the ends show a pattern. The threads are held firmly in a frame, so as to form a dense mass, with the upper ends of the threads presenting a close surface; this surface is smeared with a cement, and has a backing of canvas attached, after which a transverse section is cut the desired thickness of the pile, and so on with a number of similar sections.

Mosasaurus, a gigantic extinct marine lizard occurring in the calcareous freestone which forms the most recent deposit of the



Skull of *Mosasaurus Hofmanni*.

Cretaceous formation. This reptile was about 25 feet long, and furnished with a tail of such construction as must have rendered it a powerful oar.

Moscheles (mō'she-les), Ignaz, a pianist and composer, born at Prague 1794, his father being a Jewish merchant. He was professor of music at the Royal Academy, London, in 1821–46. Mendelssohn in Berlin and Thalberg in London were among his pupils, and at Mendelssohn's request Moscheles gave up his London professorship and took a similar post at Leipzig, retaining it till his death in 1870. Among his finest compositions may be mentioned his Concertos Nos. 3, 4, and 5; the Concertos Fantastique and Pathétique; his Sestett and Trio; his Sonatas Caractéristique and Mélancolique; and his studies.

Moschidæ (mos'ki-dē), the musk-deer family of animals. See *Musk-deer*.

Moschus, a Greek pastoral poet, a native of Syracuse. The time when he flourished is not accurately known, some making him a pupil of Bion, who is supposed to have lived under Ptolemy Philadelphus (3d century B.C.), while others suppose him a contemporary of Ptolemy Philomētor (B.C. 160). Four idyls form the whole of the remains

of Moschus, of which the most beautiful is the fine lament for Bion.

Mos'cow (Russian, *Moskwá*), the second capital (formerly the only capital) of the Russian Empire. It is the chief town of the government of the same name, and is situated in a highly-cultivated district on the Moskwa, 400 miles south-east of St. Petersburg, with which it is in direct communication by rail. It is surrounded by a wall or earthen rampart 26 miles in circuit and of no defensive value; and a considerable portion of the inclosed space is unoccupied by buildings. The quarter known as the Kreml or Kremlin, on a height about 100 feet above the river, forms the centre of the town, and contains the principal buildings. It is inclosed by a high stone wall, and contains the old palace of the czars and several other palaces; the cathedral of the Assumption, founded

Moscow—General View of the Kremlin.

in 1326, rebuilt in 1472; the church of the Annunciation, in which the emperors are recrowned; the cathedral of St. Michael; the Palace of Arms, an immense building occupied by the senate, the treasury, and the arsenal; and the Tower of Ivan Veliki (209 feet), surmounted by a gilded dome, and having at its foot the great Czar Kolokol, or king of bells, 60 feet round the rim, 19 feet high, and weighing upwards of 192 tons, the largest in the world. Outside the Kreml the chief building is the cathedral of St. Vassili, with no less than twenty gilded and painted domes and towers, all of different shapes and sizes. Among the principal educational establishments are the Imperial University, founded in 1755 by the Empress Catharine. It has a rich museum and a library of 200,000 volumes, and is the most important of the Russian universities. Moscow is the first manufacturing city in the empire, and of late years its industrial and commercial activity has greatly increased. The principal manufactures are textile fabrics, chiefly woollen, cotton, and silk, besides hats, hardware, leather, chemical products, beer, and spirits. From its central position Moscow is the great entrepot for the internal commerce of the empire. The foundation of the city dates from 1147. It became the capital of Muscovy, and afterwards of the whole Russian Empire; but was deprived of this honour in 1703, when St. Petersburg was founded. The principal event in the history of Moscow is the burning of it in 1812 for the purpose of dislodging the French from their winter quarters. Pop. (1888), 798,740.—The government forms an undulating tract of about 13,000 square miles, and the soil is mostly productive, the forests occupying about 39 per cent. Pop. 2,183,579.

Moselle (mo-zel'; German, *Mosel*), a river which rises in France, in the department of

Vosges, and which after a winding, and in some parts very tortuous, course falls into the Rhine at Coblenz; total length, about 360 miles, of which 220, commencing at the junction of the Meurthe, are navigable. The wines of the Moselle basin are well known as light sparkling wines, with a marked aroma.

Moselle, formerly a department of France; area, 2034 square miles. The south-eastern and major part was ceded to Germany in 1871; the remainder, united to Meurthe, forms the new department of Meurthe-et-Moselle (which see).

Moses, leader, prophet, and legislator of the Israelites, was born in Egypt about 1600 B.C., during the time of the oppression of the Hebrews. His father, Amram, and mother, Jochebed, both of the race of Levi, were obliged to expose him in obedience to a royal edict, but placed him in a basket of bulrushes on the river border, where he was found by the daughter of the Egyptian king as she went to bathe. She adopted him as her son, and in all probability had him educated for the duties of the priesthood, the means of instruction thus afforded him being the best which his time possessed. His expedition into Ethiopia, in his fortieth year, as leader of the Egyptians, when he subdued the city of Saba (Meroe), won the affections of the conquered Princess Tharbis, and married her, rests only on the tradition preserved by Josephus. An outrage committed by an Egyptian on a Hebrew excited his anger, and he secretly slew the Egyptian. The deed became known, and he escaped the vengeance of the king only by a hasty flight into Arabia. Here he took refuge with Jethro, a Midianitish prince and a priest, and espoused his daughter Zipporah. The promises of God that his race would become a great nation occupied much of his thoughts, and at last God appointed him the chosen deliverer from the bondage in Egypt. Being slow of speech, and possessing none of the arts of an orator, God therefore gave him power to prove his mission by miracles, and joined to him his elder brother Aaron, a man of little energy, but of considerable eloquence. Thus prepared, Moses returned to Egypt at the age of eighty years to undertake the work. At first he had the greatest obstacles to overcome, but after the visitation of ten destructive plagues upon the land, Pharaoh suffered the Hebrews to depart. Moses conveyed them safely through the Red Sea, in which Pharaoh, who pursued them, was drowned with his army. New difficulties arose, however. The distress of the people in the desert, the conflicts with hostile races, the jealousies of the elders, often endangered his authority and even his life, despite the miraculous attestations of his mission. During the term of the encampment at Sinai he received the Ten Commandments and the laws for the regulation of the lives of the Israelites. When they were already near the end of their journey towards Canaan Moses saw himself compelled, in consequence of new evidences of discontent, to lead them back into the desert, for forty years more of toilsome wandering. He was not himself permitted, however, to see the Israelites settled in their new country on account of a murmur which, in the midst of his distresses, he allowed to escape against his God. After appointing Joshua to be the leader of the Hebrews he ascended a mountain beyond Jordan, from which he surveyed the land of promise, and so ended his life in his 120th year. All superstitious reverence for his bones or his place of sepulture was prevented by the secrecy of his burial, and its effectual concealment from the people. See *Pentateuch*.

Mosheim (mos'hīm), JOHANN LORENZ VON, German theologian, born at Lübeck in 1694, studied at Kiel. In 1723 he became professor of theology at Helmstädt. In 1747 he was appointed professor and chancellor of the University of Göttingen, where he remained till his death in 1755. Mosheim was the father of ecclesiastical history. His principal work on this subject is the Institutiones Historiæ Ecclesiasticæ (1755), afterwards published under various other forms, and translated into German and English.

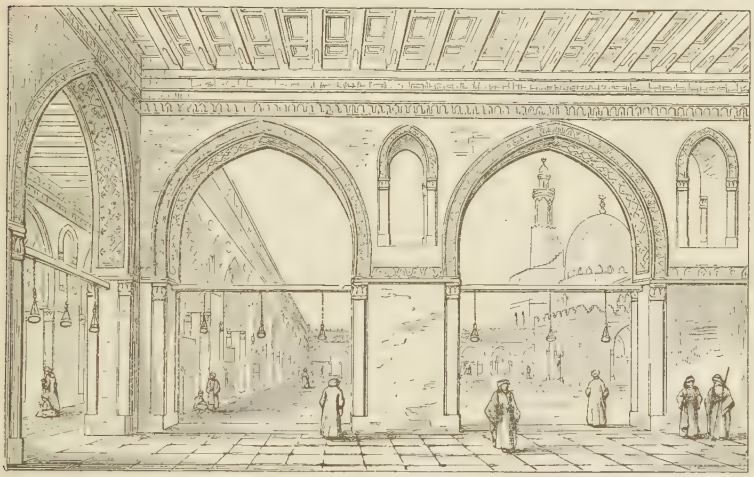
Moskwa, BATTLE OF THE. See *Borodino*.

Moslem (Arabic, *muslim*, a true believer; plural, *muslimin*, hence the corrupt form, *musulman*), a general appellation in European languages for all who profess Mohammedanism.

Mosque, a Mohammedan church or house of prayer. These buildings are constructed in the Saracenic style of architecture, and often astonish by their extent and the grandeur and height of their cupolas or domes. In these Mohammedan places of worship we find neither altars, paintings, nor images, but a great quantity of lamps of various kinds, arabesques which form the principal interior ornament, and sentences from the Koran written on the walls.

Every mosque has its minaret or minarets (which see). The buildings are often quadrangular in plan, with an open interior court, where are fountains for ablutions. The floor is generally covered with carpets, but there are no seats. In the direction towards Mecca is the *mihrab*, a recess in the wall to direct the worshippers where to turn their eyes in prayer, and near this is the *mimbar* or pulpit. The buildings may embrace accommodation for educational purposes, &c., besides the temple proper.

Mosquito (mos-kē′tō), a general name for such insects of the gnat family as inflict a severe bite and make themselves a pest to people residing in warm climates, or during the warm season in many arctic regions. As a protection for sleepers close curtains of gauze (mosquito nets or curtains) are used; and the skin is also rubbed with various



Court of the Mosque of Tooloon, Cairo.

preparations to prevent their bites, and fires are lighted to drive them off. See *Gnat*.

Mosquito Territory, a region of Central America, lying on the Caribbean Sea, and forming the eastern seaboard of Nicaragua. For a considerable period it was governed by a native chief, and was under British protection, but in 1860 it was made over to the state of Nicaragua. The capital is called Bluefields.

Moss-agate. See *Mocha-stone*.

Mosses, a group of cryptogamic or flowerless plants of considerable extent, and of great interest on account of their very singular structure. They are in all cases of small size, seldom reaching a foot in height, but having a distinct axis of vegetation, or stem covered with leaves; and are propagated by means of reproductive apparatus of a peculiar nature. They are formed entirely of cellular tissue, which in the stem is lengthened into tubes. Their reproductive organs are of two kinds—axillar cylindrical or fusiform bodies, containing minute roundish particles; and thecæ or capsules, supported upon a stalk or *seta*, covered with a *calyptra*, closed by an *operculum* or lid, within which is a *peristome* composed of slender processes named *teeth*, and having a central axis or *columella*, the space between which and the walls of the theca is filled with minute *sporules*. Mosses are found in cool, airy, and moist situations, in woods, upon the trunks of trees, on old walls, on the roofs of houses, &c. The genera of mosses, which are numerous, are principally characterized by peculiarities in the peristome, or by modifications of the calyptra, and of the position of the *urn*, or hollow in which the spores are lodged.

Mostar′, capital of Herzegovina, on both sides of the Narenta. It lies in a plain about 6 miles long by 2½ miles broad; is walled, and has a vizier's palace, a number

of mosques, and two extensive well-supplied bazaars. It carries on a considerable trade. Pop. 18,000.

Mosul', a town of Asiatic Turkey, 220 miles north-west of Bagdad, on the right bank of the Tigris, opposite the remains of the ancient Nineveh, where there is a bridge of boats. The houses are mostly built of sun-dried bricks, and besides numerous mosques there are churches of the Nestorians, Jacobites, and other Christians. It has a transit trade between Bagdad, Syria, Kurdistan, and Constantinople. Its principal manufactures are cotton stuffs. It was formerly celebrated also for its muslins (hence the name *muslin*). Pop. estimated at 40,000.

Motacil'la, a genus of passerine birds including the wagtails.

Motaz'ilites, a numerous and powerful sect of Mohammedan heretics, who to a great extent denied predestination, holding that man's actions were entirely within the control of his own will. They maintained also that before the Koran had been revealed man had already come to conclusions regarding right and wrong, and held extremely heretical opinions with reference to the quality or attributes of Deity. They appeared a few generations after Mohammed, and became the most important and dangerous sect of heretics in Islam.

Motet', in music, a name applied to two different forms of composition: (1) a sacred cantata, consisting of a number of unconnected movements, as solos, duets, trios, quartetts, choruses, fugues, &c. (2) A choral composition, usually of a sacred character, beginning with an introductory song, followed by several fugal subjects, the whole ending with the exposition of the last subject, a repetition of the introduction, or a special final subject.

Moth, the popular name of a numerous and beautiful division of lepidopterous insects, readily distinguished from butterflies by their antennæ tapering to a point instead of terminating in a knob, by their wings being horizontal when resting, and by their being seldom seen on the wing except in the evening or at night (though some moths fly by day); hence the terms crepuscular and nocturnal lepidoptera applied to them. Amongst the more notable of the moths are the 'feather' or 'plume-moths,' the death's-head moth, the 'clothes-moths,' and the 'silk-moth' (*Bombyx mori*).

Mother Carey's Chicken, the sailors' name for the stormy petrel. See *Petrel*.

Mother-of-pearl, or NACRE, the hard silvery brilliant internal or nacreous layer of several kinds of shells, particularly of the oyster family, often variegated with changing purple and azure colours. It is destitute of colouring matter, but is composed of a series of minute and slightly imbricated layers or ridges which have the power of decomposing the rays of light, thus producing beautiful iridescent hues. The large oysters of the tropical seas alone secrete this coat of sufficient thickness to render their shells available for the purposes of manufacture. Mother-of-pearl is extensively used in the arts, particularly in inlaid work, and in the manufacture of handles for knives, buttons, toys, snuff-boxes, &c.

Motherwell, a town in Scotland, county of Lanark, 12 miles south-east of Glasgow. The inhabitants are chiefly employed in its extensive coal-mines, iron and steel works, foundries, and engineering shops. Pop. 12,904.

Motherwell, WILLIAM, a Scottish poet and antiquary, born in Glasgow 1797, died 1835. Educated at Edinburgh and Paisley, at the age of fifteen he was apprenticed to the sheriff-clerk of the latter town, and became sheriff-depute in 1819. It was while in this situation that he did his best work both as poet and ballad-collector. After editing the collection of songs called the Harp of Renfrewshire (published in 1819), he compiled the more important collection of ballads published in 1827, under the title of Minstrelsy: Ancient and Modern, with a historical introduction and notes. In 1828 he became editor first of the Paisley Advertiser, and then (1830) of the Glasgow Courier. He published in 1832 a collection of his own poems.

Motherwort (*Leonūrus cardiăca*), a labiate plant, 3 feet high, flowers in crowded whorls, white with a reddish tinge, found in some parts of England and North America.

Motion, in physical science, is the passing of a given body from one place to another. We have no idea of absolute position in space, so that when we speak of the motion of a point it is only in relation to some point regarded as fixed. Thus our conception of the movement of the earth is derived from its relation in position to the sun and stars. Bodies move in various directions, their motion being described as *rectilinear* when they move in a straight line, *curvilinear* when they move in a curve, *vibratory* when they move to and fro in relation to a fixed

point, *rotatory* when they turn on an axis, and *circular* when they sweep round a given point. For Newton's laws of motion see *Dynamics*.

Motley, JOHN LOTHROP, historian and diplomatist, born in Massachusetts, America, 1814, died 1877. He was educated at Harvard University and at Göttingen in Germany; published two novels called Morton's Hope (1839) and Merry Mount (1849), both of which were unsuccessful; contributed to the North American Review; and entered political life as a member of the Massachusetts' House of Representatives. He published, after ten years' labour and a journey to Europe, his great History of the Rise of the Dutch Republic in 1856, a work which was further developed in the History of the United Netherlands (1860–65); and the Life and Death of John of Barneveld (1874). He was ambassador from the United States to Vienna in 1861–67, and to London in 1869–70. His correspondence, in 2 vols. edited by Geo. W. Curtis, has been published (1889).

Mot-mot, a beautiful South American fissirostral bird of the genus *Momotus* or *Prionites*, about the size of a jay.

Mott, VALENTINE, surgeon, was born in Glen Cove, Long Island, in 1785. He studied in London and Edinburgh. In 1811 was professor of surgery in Columbia College; afterwards in other colleges. Dr. Mott early gained a world-wide reputation for boldness and originality as an operative surgeon. He was the most intrepid operator of his time. He died in 1865.

Moufflon, MOUFLON, the *Ovis*, or *Caprovis*, *Musimon*, a wild animal of the sheep kind, inhabiting the mountainous parts of Corsica, Sardinia, and Greece. It is about the size of a small fallow-deer, and, although covered with hair instead of wool, bears a stronger resemblance to the ram than to any other animal, both in regard to its horns and its general conformation. The name is also given to allied forms, such as the argali.

Moukden. See *Mukden*.

Mould, a minute fungoid or other vegetable growth of a low type, especially one of such vegetable organisms as appear on articles of food when left neglected, on decaying matters, bodies which lie long in warm and damp air, animal and vegetable tissues, &c.

Mouldings, in arch. a general term applied to the varieties of outline or contour given to the surfaces or edges of various subordinate parts or features of buildings, whether projections or cavities, such as cornices, bases, door or window jambs, lintels, &c.

Moulins (mö-lan), a town of France, capital of the department of Allier, on the river of that name, 164 miles S.S.E. of Paris. It has among its edifices a cathedral, a college, an old castle, and its chief manufactures are cutlery, hosiery, ivory articles, &c. Pop. 18,770.

Moulmein (möl-mīn′), or MAULMAIN (mal-mān′), a seaport of Burmah, division of Tenasserim, at the mouth of the river Salween.

It has a good harbour, and a considerable trade chiefly in teak, cotton, rice, tobacco, stick-lac, lead, copper, cocoa-nuts, hides, and live stock. Pop. 53,107.

Moult, the process of shedding or casting feathers, hair, skin, horns, &c. The word is most commonly used with regard to birds; but other animals, such as crabs and lobsters, which shed their entire shells, frogs and serpents, which cast their skins, and deer, which shed their horns, are also said to moult.

Mountain, a mass of earth and rock rising above the surface of the globe higher than a hill. Mountains are usually found in groups, systems, ranges, or chains, though

isolated mountains, due to volcanic action, are also found. The elevation of great mountain masses is due to gigantic subterranean movements long continued; but mountains of considerable mass have also been carved out by surface denudation. The highest mountain in the world is Mount Everest, one of the Himalayan range, which is 29,002 ft. above the level of the sea.

Mountain, The. See *Montagnards.*

Mountain-ash. See *Rowan-tree.*

Mountain-blue, a carbonate of copper with an azure vitreous lustre which is liable to change to green if the substance is mixed with oil.

Mountain-cork, a white or gray variety of asbestos, so called from its extreme lightness, as it floats in water. Called also *Mountain-leather.*

Mountain-limestone, a calcareous rock, containing marine shells and corals, devoid of coal. It is situate immediately below the millstone-grit, and above the old red sandstone. It is otherwise termed *Carboniferous Limestone.*

Mountain-soap, a mineral of pale brownish-black color, named from its soapy feel.

Mount Carmel, Northumberland co., Pa., a coal-mining borough on the P. & R. and Lehigh Valley R. Rs. Pop. 1890, 8254.

Mount Cook, the culminating point of New Zealand; height, 13,200 ft.

Mt. Vernon, Fairfax co., Va., 15 m. from Washington City, contains the former residence of Gen. Washington, which has many articles of interest. It is owned by the "Ladies' Mt. Vernon Association."

Mount Vernon, Knox co., Ohio, 45 m. N. E. Columbus. Pop. 1890, 6027.

Mt. Vernon, Westchester co., N. Y., 14 m. N. E. from New York. Pop. 1890, 10,830.

Mourning, as the outward expression of grief, has greatly varied at different times and among different nations. Thus the eastern nations and the Greeks cut off their hair, while the Romans allowed the beard and hair to grow; and as an evidence of mourning the ancient Egyptians wore yellow; the Ethiopians, gray; the Roman and Spartan women, white, which is still the colour of grief in China, Japan, and Siam; in Turkey, blue and violet; and in the other European countries black is used for this purpose. The Jews, in sign of grief at the loss of their relatives, rent their garments, tore out their hair, and wore coarse garments of a dark colour; and with the Greeks and Romans it was the custom to lay aside all ornaments of dress, to abstain from the bath, and other indulgences.

Mourzouk, or MURZUK (mụr-zụk'), the capital of the pashalic of Fezzan, in the regency of Tripoli, situated 480 miles south-east of Tripoli. It is girt by an earthen wall, and was at one time a place of great commercial importance. Pop. 3000.

Mouse, the name of a number of rodents of which the most familiar is the domestic mouse (*Mus musculus* or *domesticus*), too well known to need description. The harvest-mouse (*Mus messorius* or *minutus*), the smallest of quadrupeds, is a hybernating mammal, and constructs a little nest of grass, &c., entwined round and supported by the stalks of the corn or wheat. The common field-mouse (*M. sylvaticus*) is a dusky brown, with a darker strip along the middle of the back, whilst the tail is of a white colour beneath. There are about a hundred members of the mouse genus, of which the common rat is one. The short-tailed field-mouse, or 'meadow-mouse,' is not a true mouse, but one of the voles (*Arvicola*). It is of a reddish-brown colour, inclining to gray, the under parts are lighter, or ashy-brown, and the tail and feet are of a dusky-gray colour. The dormouse also is of a different family from the true mice.

Mouse-ear Chickweed (*Cerastium*), a genus of plants, natural order Caryophyllaceæ, consisting of many pubescent herbs with small leaves and white flowers, forming common weeds in all temperate and cold regions. The Virginia mouse-ear is found from Canada to Florida.

Mousquetaires du Roi (mös-kė-tār dụ rwȧ; 'musketeers of the king'), under the old French régime mounted companies of royal guards. They were instituted by Louis XIII., and served as a school to many of the most distinguished French commanders.

Mouth, the aperture in the head of an animal through which food is received and voice uttered; or generally the anterior opening of the alimentary canal. In the higher animals the use of the mouth is for mastication, the emission of sound or voice, deglutition, and taste. In many animals of a low type of structure there is no distinct mouth. Thus in the simpler Protozoa the food is taken into the interior of the body by a process of intussusception, any portion of the surface being chosen for this purpose, and acting as an extemporaneous mouth, which closes up again when the particle of food has been received into the body.

Moving Plant (*Desmodium gyrans*, natural order Leguminosæ), a native of India, often cultivated in Europe in stoves, having violet flowers, and leaves consisting of two lateral leaflets and one larger terminal leaflet. It is remarkable for the motions of its leaflets, which are constantly twisting about in a variety of ways, especially under the influence of light and heat.

Moxa, a soft downy substance prepared in China and Japan from the young leaves of certain species of *Artemisia*. In eastern countries it is used for the gout, &c., by burning it on the skin. This produces a dark-coloured spot, the exulceration of which is promoted by applying a little garlic.

Mozambique (mo-zam-bēk′), a Portuguese government on the east coast of South Africa, extending from Cape Delgado to Delagoa Bay, and to an uncertain distance into the interior; area estimated at about 380,000 square miles, only a small part of which is occupied. The coast is generally low, beset with reefs and small islands, and possessed of very few good harbours. Inland there rises a broad plateau, with groups and chains of mountains running mostly parallel to the coast, and nowhere reaching a great height. The climate is excessively hot, and, except on the elevated regions, unhealthy. Most tropical fruits thrive, cotton succeeds well, and the forests produce valuable woods. The principal articles of trade are ivory and skins. The capital is the town of Mozambique, situated upon a small coral island near the coast, having a good harbour and a small trade. Pop. 8522. The population of the country is quite uncertain.

Mozambique Channel, the passage between the east coast of Africa and the island of Madagascar; length about 1050 miles, average breadth about 450 miles. In its north part lie the Comoro Islands.

Mozar′abs, a name applied by the Mohammedans in Spain to the Christians among them who retained their own religion. The Mozarabic liturgy which they used was suppressed about 1060, but was revived at the beginning of the 16th century in Toledo, where it is still preserved.

Mozart (mo-zärt′; German pron. mō′-tsärt), Johann Chrysostomus Wolfgang Amadeus, a great German composer, born at Salzburg 1756, died at Vienna 1791. At the age of four years his father, Leopold Mozart, a violinist of repute, began to teach him some minuets and other small pieces on the harpsichord. From this period he made rapid progress, and a concerto for the harpsichord, which he wrote in his fifth year, was so difficult that only the most practised performer could play it. In his sixth year Mozart was taken by his father, along with his sister, to Munich and Vienna, where the little artists were received at court with great favour. In 1763 the family made a journey to Paris, where Mozart published his first sonatas for the harpsichord; and in the following year they proceeded to England, where the child-musician performed before the court the most difficult compositions of Bach and Handel. Returning to Salzburg after visiting Holland, the family again went to Vienna in 1767, where the boy received a commission from the emperor to write the music of a comic opera, but owing to the opposition of the court musicians the work was never performed. In 1769 Mozart, who had been made master of the concerts at the court orchestra at Salzburg, commenced a journey to Italy in company with his father. In Rome he wrote down, on hearing it, the famous Miserere, annually sung in the Sistine Chapel during the holy week. At Milan in 1770 he composed, in his fourteenth year, his first opera, Mithridates, which was performed more than twenty times in succession. Henceforth he resided chiefly in Salzburg, but also visited Paris, Munich, and finally Vienna. In the latter city, although he was appointed composer to the court, he found it necessary to maintain himself by giving lessons in music and writing waltzes. Notwithstanding this poverty it was here that most of his best work, such as his famous operas, Le Nozze di Figaro (The Marriage of Figaro), Don Giovanni, La Clemenza di Tito (Clemency of Titus), Die Zauberflöte (The Magic Flute), and his last work the Requiem, were written. It was here also that the best pianist and greatest composer of his time—perhaps of the world—died in obscurity and was buried in a pauper's grave. The extent of work done by Mozart during his short life is almost incredible, and in every department of composition, whether vocal or instrumental, he excelled. In the history of music he stands most prominently forward as an operatic composer, his Don Giovanni, Magic Flute, and Marriage of Figaro being works previously unequalled and never since surpassed. In his character he was kind-hearted, guileless, cheerful, void of envy, almost boyish to the last.

Mtzensk, a town of Russia, prov. of Orel, 35 miles N.E. of Orel. Pop. 14,159.

Mualitch'. See *Muhalitch*.

Much Woolton, a town of England, county of Lancaster, 5 miles south-east from Liverpool. There are extensive quarries in the neighbourhood. Pop. 4539.

Mucilage, a solution of some gummy substance in water, giving it a certain consistence; in chemistry, one of the proximate elements of vegetables, a carbohydrate ($C_6H_{10}O_5$, or similar formula). It is contained abundantly in gum tragacanth, many seeds, as linseed, quince seed, &c., and certain roots, as marsh-mallow. It forms a thick jelly with water, and when boiled with dilute sulphuric acid gives rise to a sugar and a gum.

Mu'cius Scævola (sē'vo-la), the hero of a Roman legend to the effect that having attempted to assassinate Porsenna, king of Etruria, Mucius was ordered to be burned alive, but he won the king's favour and pardon by fearlessly holding his hand in the fire.

Mucor, a genus of fungi to which most of the matter constituting mould on cheese, paste, decaying fruits, and other substances is referred. The most common species is *M. mucēdo*.

Mucous Membrane, a membrane that lines all the cavities of the body which open externally and secretes the fluid mucus. See *Mucus*.

Mucu'na. See *Cowitch*.

Mucus, a viscid fluid secreted by the mucous membrane of animals, which it serves to moisten and defend. It covers the lining membranes of all the cavities which open externally, such as those of the mouth, nose, lungs, intestinal canal, urinary passages, &c. It is transparent, glutinous, thready, and of a saline taste; it contains a great deal of water, chloride of potassium and sodium, lactate of sodium and of calcium, and phosphate of calcium. Mucus forms a layer of greater or less thickness on the surface of the mucous membranes, and it is renewed with more or less rapidity. Besides keeping these membranes in a moist and flexible condition, it also protects them against the action of the air, of the aliment, the different glandular fluids, and agencies that might otherwise irritate and inflame.

Mud, in geology, a mixture of clay and sand with organic matter. Mud may be argillaceous, calcareous, or otherwise, according to the most notable ingredient which enters into its composition.

Mudar, the Indian name of *Calotrŏpis gigantea*, a shrub or small tree of the nat. order Asclepiadaceæ, and also given to a substance used medicinally in India with great alleged effect in cutaneous diseases, and obtained from this and another species (*C. procĕra*). The inner bark of *C. gigantea* also yields a valuable fibre.

Mud-bath, a kind of bath connected with some mineral springs, consisting of mud transfused with saline or other ingredients, in which patients suffering from rheumatism, &c., plunge the whole or portions of the body. Such are the mud-baths of St. Amand, or of Barbotan, in France.

Mud-fish. See *Dipnoi*.

Mudir', a Turkish official at the head of a canton or part of a liva under a kaimakam; in Egypt, the governor of a province or *mudîrîyeh*.

Mudki, or MOODKEE, a village of the Punjab, 65 miles south-east of Lahore, where in 1845 Sir Hugh Gough defeated the Sikhs.

Mudstone, a term originally applied to certain dark-gray fine-grained shales of the Silurian system, but now extended to all similar shales in whatever formation they may occur.

Muez'zin, or MUED'DIN, a Mohammedan crier attached to a mosque, whose duty it is to proclaim the *ezam* or summons to prayers five times a day—at dawn, at noon, 4 P.M., sunset, and nightfall. He makes his proclamation from the balcony of a minaret; and as this elevated position enables a person to see a good many of the private proceedings of the inmates of the neighbouring houses, the post of muezzin is often intrusted to a blind man.

Muffle, in chemistry, an arched vessel resisting the strongest fire, and made to be placed over cupels and tests in the operation of assaying.

Mufti, in the Turkish Empire, a religious officer who exercises the functions of an authoritative judge in matters of religion. The muftis are chosen from among the ulemas or doctors of the law, and the grand mufti or Sheikh-ul-Islam is the highest officer of the church and the representative of the sultan in spiritual matters.

Muggletonians, a sect that arose in England about the middle of the 17th century, of which the founders were John Reeve and Ludovic Muggleton, who claimed to have the spirit of prophecy. They affirmed themselves to be the 'two witnesses' of Rev. xi. 3.

Muhalitch', or MUALITCH, a town of Asiatic Turkey, about 15 miles south of the Sea of Marmora. It has a considerable trade with Constantinople. Pop. about 11,000.

Muhlenberg, FREDK. AUGUSTUS, first Speaker of the House of Representatives of the U. S., born at Trappe, Pa., June 2, 1750. After various ministerial appointments for the Lutherans, became a member of the Continental Congress, 1779; was chosen President of Convention called to ratify the Federal Constitution. Died at Lancaster, Pa., June 4, 1801.

Muhlenberg, HEINRICH MELCHIOR, D. D., born in Hanover, Sep. 6, 1711. He was the organizer of the Lutheran church in the U. S. Arrived in Philadelphia, Nov. 25, 1742, to take charge of the German settlements from Nova Scotia to Georgia. He founded the first Synod, 1748. He advocated the use of the English language in the churches. Died at Trappe, Pa., Oct. 7, '87.

Muhlenberg College, Allentown, Pa., founded 1867, and named in honor of Heinrich Melchior Muhlenberg. It is endowed ($150,000); has a faculty of 11, exclusive of lecturers, and a large library.

Mühlhausen, Prus. Saxony. P. 25,141.

Mühlhausen, in Alsace-Lorraine; an industrial centre. Pop. 76,672.

Mühlheim, Germany. Pop. 24,975.

Mühlheim, or MÜLHEIM, a town of Germany, in the Rhine valley, on the Ruhr, 14 miles north of Düsseldorf. It has cotton-spinning, weaving, and cloth manufactures, iron-foundries, &c. Coal is mined here, and forms an important article of trade. Pop. 24,465.

Muir, JOHN, a Sanskrit scholar, born at Glasgow in 1810, died 1882. He was educated at the university of his native city, and joined (1828) the East India Company's Civil Service, filling various offices until his retiral in 1853. His chief works are: A Sketch of the Argument for Christianity against Hinduism in Sanskrit Verse (1839), Original Sanskrit Texts on the Origin and History of the People of India, their Religion and Institutions, 5 vols. (1858–70); Metrical Translations from Sanskrit Writers (1878); and a translation of Kuenen's Five Books of Moses. He was D.C.L. and LL.D.

Muir, SIR WILLIAM, LL.D., Arabic scholar and brother of the above, was born at Glasgow in 1819; educated at Glasgow and Edinburgh universities; entered the Bengal Civil Service (1837); attained various official positions until he became Lieutenant-governor of the North-west Provinces (1868); returned to England (1876), and became a member of the Council of India, an office which he held until he was appointed Principal of Edinburgh University in 1885. His writings include: The Life of Mahomet (1858–61, abridged edition 1877), Annals of the Early Caliphate (1883), The Corân (1877), and Mahomet and Islam (1884).

Mukden (mŭk'den), MOUKDEN, or FUNG-TIEN-FU, a town of China, capital of Manchuria and of the province of Leao-Tong, about 380 miles N.E. of Peking. It is surrounded by a wall and has also a wall which incloses the government offices, palace, and other buildings, and it was the residence of the Manchu sovereigns before their conquest of China. Pop. about 150,000.

Mula, a town of Spain, province of and 21 miles west from Murcia. The principal manufacture is earthenware. Pop. 10,597.

Mulatto, a person that is the offspring of parents of whom one is white and the other a negro. The mulatto is of a dark colour tinged with yellow, with frizzled or woolly hair, and resembles the European more than the African.

Mulberry, a fruit-tree of the genus *Morus*, nat. order Moraceæ, akin to the Urticaceæ or nettles. The black or common mulberry (*Morus nigra*) is the only species worthy of being cultivated as a fruit-tree. The fruit is used at dessert, and also preserved in the form of a syrup. The juice of the berries mixed with that of apples forms a beverage of a deep port-wine colour, called mulberry cider. The tree thrives in England, but is probably not originally a native of Europe. The white mulberry (*M. alba*) is the most interesting of the genus, on account of its leaves being used for food by silkworms. It grows to the height of 40 or 50 feet, with a trunk 2 or more feet in diameter. It came probably from China. The red mulberry (*M. rubra*) has fruit of a deep-red colour, and is a valuable American tree. The paper mulberry (*Broussonetia papyrifĕra*) is a distinct

Black Mulberry (*Morus nigra*).

genus, belonging originally to Japan, and now much cultivated in Europe. In Japan its bark is used in making paper, and its wood is highly valued for ornamental work.

Muldau. See *Moldau.*

Mule, the name applied to any animal produced by a mixture of different species, but specifically denoting the hybrid generated between an ass and a mare. The head of the mule is long and thin, its tail is bushy, and its mane short. (See *Hinny.*) The mule is employed as a beast of burden in Spain, Portugal, Italy, in the East, and in Spanish America. It unites the speed of the horse with the dogged perseverance of the ass, and is docile in temper when fairly treated.

Mule, a spinning-machine invented by Samuel Crompton in 1775, and so called from being a combination of the drawing-rollers of Arkwright and the jenny of Hargreaves. In this machine the rovings are delivered from a series of sets of drawing-rollers to spindles placed on a carriage, which travels away from the rollers while the thread is being twisted, and returns towards the rollers while the thread is being wound.

Mülhausen. See *Mühlhausen.*

Mülheim (mül'hīm). See *Mühlheim.*

Mulhouse (mül-hös). See *Mühlhausen* (in Alsace-Lorraine).

Mull, an island on the west coast of Scotland, one of the Hebrides, belonging to Argyllshire, from which it is separated by the Sound of Mull and the Firth of Lorne; length 30 miles, breadth 29 miles. The island is for the most part mountainous, the highest point being Benmore, 3185 ft. above sea-level. The land in some parts is adapted for grazing, and there are numerous fresh-water lochs. The only town is Tobermory. Pop. 5229.

Mullagataw'ny, a soup which is made with fowl or meat cut into small pieces and mixed with rice, curry powder, &c.

Mullein (mul'en), the common English name for the plant *Verbascum Thapsus,* nat. order Scrophulariaceæ. The common mullein grows in old fields, road-sides, &c., and is a tall rough plant. The flowers are yellow, almost sessile, and are disposed in a long cylindrical spike.

Müller (mül'ėr), Friedrich Max, a celebrated philologist, son of the German poet Wilhelm Müller, was born at Dessau in 1823; entered the University of Leipzig, where he studied Sanskrit under Brockhaus, and published (1844) the Hitopadesa, a collection of Sanskrit fables; proceeded then to Berlin, where he attended the lectures of Bopp and Schelling; continued his studies under Burnouf in Paris; came to England in 1846, and established himself at Oxford, where he was appointed successively Taylorian professor of modern languages (1854), assistant, and ultimately sub-librarian at the Bodleian library (1865), and professor of comparative philology (1868), a position which he still (nominally at least) holds, though he practically resigned in 1875. He is a foreign member of the French Institute, and an LL.D. of Cambridge and Edinburgh. His numerous writings include an edition of the Rig-Veda (6 vols. 1849–74); History of Sanskrit Literature (1859); Lectures on the Science of Language (2 series, 1861 and 1864; many editions since); Chips from a German Workshop (4 vols. 1868–75); On the Origin and Growth of Religion (1878); Selected Essays (2 vols. 1882); The Science of Thought (1887); Biographies of Words (1888); Natural Religion (1889); and he is the editor of the series of Sacred Books of the East undertaken by the university.

Müller, Johann, a German physiologist, born at Coblenz 1801, died 1858. He studied medicine at Bonn, first becoming (1830) professor of physiology there, and then occupying the same position at Berlin from 1833 until his death. He was the author of Elements of Physiology (1837) and other works.

Müller, Karl Otfried, a German classical scholar, born 1797, died at Athens 1840. He studied at Breslau and Berlin; was appointed (1817) professor of ancient languages in the former city; obtained the chair of archæology at Göttingen in 1819; visited Italy, and then Greece, where he died. His best-known works are on the Dorians, and the Etruscans, and his History of the Literature of Ancient Greece (1840).

Müller, Wilhelm, a German poet, born at Dessau 1794, died 1827. He studied at Berlin; volunteered in 1813 into the Prussian army, and was present at the battles of Lützen, Bautzen, Hanau, and Culm; journeyed to Italy in 1819; and on his return was appointed teacher of Latin and Greek at Dessau. His chief poetical works are lyrical, and are very popular in Germany. He also published the Library of the Seventeenth Century German Poets. His son is the well-known Friedrich Max Müller. See above.

Müller, William James, landscape and figure painter, born in 1812 at Bristol, where his father, a German clergyman, was curator of the museum. He studied painting under J. B. Pyne, and first exhibited in the Royal Academy in 1833. In 1833–34 he visited Germany, Switzerland, and Italy, and in 1838 Greece and Egypt; while in 1843 he accompanied, at his own expense, the Lycian expedition under Sir Charles Fellowes, bringing back many sketches and pictures of oriental life and scenery. He lived for some time in London, but returned to Bristol to die in 1845. His pictures, though not numerous, are of exceptional power and merit, among the more notable being the Baggage Waggon, Dredging on the Medway, and The Slave Market, all exhibited in the Manchester collection of 1887, and the Salmon-weir at South Kensington.

Mullet, a name common to two groups of acanthopterygian fishes, viz. the family Mugilidæ, or gray mullets; and the family Mullidæ, or red mullets. Naturalists, however, generally restrict the name to the former, designating the red mullets as surmullets. Of the true mullets the best-known is the common gray mullet (*Mugil capito*), found round the shores of the British islands, and in particular abundance in the Mediterranean. It grows to the length of 18 to 20 inches, and will sometimes weigh from 12 to 15 lbs. It has the habit of rooting in the mud or sand in search of food. Another species also called gray mullet (*M. cephalus*), a native of the Mediterranean, is distinguished by having its eyes half covered by an adipose membrane. It weighs usually from 10 to 12 lbs., and is the most delicate of all the mullets. A smaller species, the thick-lipped gray mullet (*M. chelo*), is common on the British coasts. Many other species, natives of India and Africa, are much esteemed as food.

Mullingar', a market town, Ireland, capital of Westmeath county, on the Brosna, 50 miles N.W. of Dublin. It has a Roman Catholic cathedral and college, a court-house, barracks, county jail, &c. Pop. 4787.

Mullion, a vertical division between the lights of windows, screens, &c., in Gothic architecture. Mullions are rarely found earlier than the Early English style. The term is also applied to the division between the panels in wainscotting.

Mulock, Dinah Maria. See *Craik.*

Mulready, William, R.A., was born at Ennis, Ireland, 1786, died 1863. He became a student of the Royal Academy about 1800; exhibited The Rattle (1808), The Music Lesson (1809), at the Royal Academy, and his Idle Boys (1815) secured his election as an associate of the Academy, while the following year he was elected an academician. Among the most popular of his numerous pictures after this time were The Wolf and the Lamb (1820), The Last In (1835), The Seven Ages of Shakspere (1838), The Sonnet (1839), illustrations to The Vicar of Wakefield (1840), The Whistonian Controversy (1844), Choosing the Wedding Gown (1845), Burchell and Sophia (1847), Women Bathing (1849), and The Toyseller (1861).

Multan', or **Mooltan',** a city of India, in the Punjab, the chief city and capital of a district of same name, is situated 4 miles from the Chenab, is partly surrounded by a wall, and is overlooked by a fortress of some strength occupied by European troops. The streets are mostly narrow and tortuous. It is one of the most ancient cities in India, and is the centre of a large trade. Pop. 68,674.—The district has an area of 5880 sq. miles; pop. 551,964.

Multiple, in arith. a number which contains another an exact number of times without a remainder; as, 12 is a *multiple* of 3, the latter being a *submultiple* or aliquot part. A *common multiple* of two or more numbers contains each of them a certain number of times exactly; thus 24 is a common multiple of 3 and 4. The *least common multiple* is the smallest number that will do this; thus 12 is the least common multiple of 3 and 4. The same term is applicable to algebraic quantities.

Multiple-poinding, in Scots law, double-poinding or double-distress. It gives rise to an action by which a person possessed of money or effects which are claimed by different persons, obtains an authoritative arrangement for the equitable division thereof among the different claimants. It corresponds to *interpleader* in our law.

Multivalves, the name given to such shell-fish or molluscous animals as possess shells which consist of more than *two* pieces. See *Mollusca.*

Mum, a malt liquor which derives its name from Mumme, a German, who first brewed it. It is made of the malt of wheat, with the addition of a little oat and bean meal, is of dark-brown colour and sweetish taste.

Mummies, dead human bodies embalmed and dried after the manner of those taken from Egyptian tombs. An immense number of mummies have been found in Egypt, consisting not only of human bodies, but of various animals, as bulls, apes, ibises, crocodiles, fish, &c. The processes for the preservation of the body were very various. Those of the poorer classes were merely

Mummy of Penamen, priest of Amun Ra.—British Museum.

dried by salt or natron, and wrapped up in coarse cloths and deposited in the catacombs. The bodies of the rich and the great underwent the most complicated operations, and were laboriously adorned with all kinds of ornaments. Embalmers of different ranks and duties extracted the brain through the nostrils, and the entrails through an incision in the side; the body was then shaved, washed, and salted, and after a certain period the process of embalming (see *Embalming*), properly speaking, began. The whole body was then steeped in balsam and wrapped up in linen bandages; each finger and toe was separately enveloped, or sometimes sheathed in a gold case, and the nails were often gilded. The bandages were then folded round each of the limbs, and finally round the whole body, to the number of fifteen to twenty thicknesses. The head was the object of particular attention; it was sometimes enveloped in several folds of fine muslin; the first was glued to the skin, and the others to the first; the whole was then coated with a fine plaster. The Persians, Assyrians, Hebrews, and Romans had all processes of embalming, though not so lasting as that of Egypt. The art also was practised by the Guanches of the Canaries, the Mexicans, Peruvians, &c. Natural mummies are frequently found preserved by the dryness of the air.

Mummy-wheat, a variety of wheat, the *Triticum turgidum compositum*, cultivated in Egypt, Abyssinia, and elsewhere; said falsely to be a variety produced from grains found in the case of an Egyptian mummy.

Mumps, a disease consisting in a peculiar and specific unsuppurative inflammation of the salivary glands, accompanied by swelling along the neck, extending from beneath the ear to the chin. Children are more subject to it than adults.

München (mün*h*'én). See *Munich*.

München-Gladbach. See *Gladbach*.

Münchhausen (mün*h*'hou-zn), Karl Friedrich Hieronymus, Baron von, a German officer, born in Hanover in 1720, died 1797. He served several campaigns against the Turks in the Russian service 1737–39. He was a passionate lover of horses and hounds, of which, and of his adventures among the Turks, he told the most extravagant stories; and his imagination finally so completely got the better of his memory that he really believed his most improbable and impossible fictions. Baron Munchhausen's Narrative, a small book of 48 pages, appeared in London in 1785. Two years after it was translated into German by Bürger, who naturally passed in Germany for the writer. The real author was Rudolf Erich Raspe (1737–94).

Muncie, Delaware co., Ind., 54 m. N. E. of Indianapolis, is a growing town, with various and extensive manufactories, including some of the largest flax-bagging factories in the U. S. Pop. 1890, 11,345.

Münden (mün'den), a town of Prussia, in Hanover, at the confluence of the Fulda and Werra, which here unite to form the Weser, 14 miles W.S.W. of Göttingen. Pop. 7053.

Mungo, a material similar to shoddy, being made from old woollen fabrics torn up for remaking.

Mungo, St., or Kentigern, the patron saint of Glasgow, an early apostle of the Christian faith in Britain, is said to have been the son of St. Theneu and a British prince, and was born at Culross about 514, and brought up by St. Serf, the head of a monastery there, whose favourite pupil he became. His name, Kentigern, was exchanged by the brethren of the monastery for *Mungo*, the beloved, on account of the affection they bore him. On leaving Culross Kentigern founded a monastery on the banks of a small stream flowing into the Clyde, subsequently the site of Glasgow Cathedral. Having some troubles with the king of the Strathclyde Britons, he afterwards took refuge with St. David in Wales, and while in this country he founded a religious establishment under a follower named Asaph, which afterwards became the seat of the

bishopric of St. Asaph. He returned to Glasgow, where he acquired a character of great sanctity, and died about 601. Numerous miracles were ascribed to him, and several legendary biographies are preserved.

Mun'goose (*Herpestes griseus*), a species of ichneumon, otherwise known as the 'gray' or 'Indian' ichneumon. Being easily domesticated it is kept in many houses in Hindustan to rid them of reptiles and other vermin, as rats, mice, &c. It has been said that it neutralizes the poison of snakes, which it fearlessly attacks, by eating, during its contests with them, the *Ophiorhiza Mungos*, or snake-root; but its immunity is really due to the extreme celerity of its movements. It is of a gray colour flecked with black, and about the size of a rat.

Munich (mū'nik; German, *München*), the capital city of Bavaria. It lies on an extensive but uninteresting plateau, about 1700 feet above sea-level, chiefly on the left bank of the Isar. The old town has a quaint and irregular character, but the new town, which has sprung up chiefly to the north and west, has a regular and imposing appearance, and altogether Munich is one of the finest towns in Germany. Vast improvements are due to the munificence of King Ludwig I. The royal palace forms a very extensive series of buildings chiefly in the Italian style, and contains many magnificent apartments and rich artistic and other treasures. Connected with it are the court church and the court and national theatre, among the largest in Germany. The city is highly celebrated for its fine galleries of sculpture (Glyptothek) and painting (Old and New Pinakothek), and for various other important collections, such as that of the Bavarian national museum. The royal library (occupying a fine building in the Florentine style) has upwards of 1,000,000 volumes and 30,000 MSS., being thus one of the largest in Europe. The university is attended by some 2500 students, and has a library of 300,000 vols. There is an academy of science, an academy of arts, and many fine churches, including the cathedral, founded in 1488. In addition to the public edifices, properly so called, Munich is rich in monuments, which adorn its squares, gardens, and public promenades. The so-called English Garden (laid out by Count Rumford) is a fine park of 600 acres watered by two arms of the Isar. The industries are numerous, and in some particular branches have acquired a high name. Among others may be mentioned painted glass and other artistic productions, mathematical, optical, and surgical instruments, gold and silver lace, jewelry, glass, carriages, bells, musical instruments, &c. Munich is the seat of the high courts of legislature and of law, and of all the more important offices of the state. It was founded by Henry, duke of Saxony, in 962; taken by Gustavus Adolphus in 1632, by the French under Moreau in 1800, and by Napoleon in 1805. Pop. 1890, 348,317.

Municipality, a town or city possessed of certain privileges of local self-government, derived from incorporating charters granted by the state. Or the term may be applied to the corporation or body of persons in a town having the powers of managing its affairs. See *Borough*, *Burgh*, *Corporation*, *Election*, &c.

Mun'jeet, or East Indian madder, a dyestuff closely allied to the common madder, and used for producing similar colours, obtained from the roots of *Rubia cordifolia*, a plant extensively grown in several parts of India.

Munkacs (mùn'kàch), a town of Hungary, on the Latorcza, 80 miles N.E. of Debreczin. In the vicinity are mines of rock-crystal. Pop. 9644.

Munkacsy (mùn'kàch-i), Mihaly, real name *Michael Lieb*, Hungarian genre and historical painter, born at Munkacs 1846; studied at Gyula, Vienna, Munich, and Dusseldorf, and settled in Paris in 1872. Among his best-known pictures are Last Day of a Condemned Man, Milton dictating Paradise Lost, Christ before Pilate, and The Crucifixion—all owned in the U. States.

Munster, the south-west province of Ireland, comprising the six counties of Clare, Cork, Kerry, Limerick, Tipperary, and Waterford. Area, 9475 square miles. Pop. 1891, 1,168,994.

Münster (mùn'stèr), a town of Prussia, capital of the province of Westphalia, in a wide plain on the Aa, 78 miles N.N.E. of Cologne. It was once fortified, but the fortifications have been converted into promenades. The principal edifices are the cathedral, the church of St. Lambert, the town-house, the exchange, museum, theatre, &c. The manufactures include woollen, linen, and cotton goods, &c. Münster was long governed by independent bishops, in whom a warlike was often much more conspicuous than a Christian spirit. The most memorable events in the history of the town occurred in 1532–35, when it fell into the

hands of the fanatical Anabaptists. (See *Anabaptists.*) Pop. 44,060.

Münster, Peace of. See *Westphalia, Peace of.*

Muntjac, a small species of deer, the *Cervŭlus muntjac,* found in British India, the Malay Peninsula, Sumatra, Java, and Borneo, about 26 inches high at the shoulder. They are of solitary habits; the male has short horns, and they use their teeth effectually in self-defence.

Muntz's Metal (from Mr. *Muntz* of Birmingham, the inventor), an alloy of 60 parts copper and 40 parts zinc, used for sheathing ships and for other purposes.

Münzer (münt'sér), Thomas, a German fanatic, born about 1490; executed 1525. He is said to have studied at Wittenberg. He preached at Zwickau in 1520, and at Prague in 1521, and he was connected with the early movements of the Anabaptists. He held a mystical belief in continuous divine revelation through dreams and visions, and promulgated the doctrine of community of goods. He collected a large number of peasant followers, who committed many outrages, but in 1525 were totally defeated, when Münzer was taken and executed.

Murad V., Sultan of Turkey, born 1840. Son of Abdul-Medjid, he succeeded to the throne on the forcible deposition of Abdul Aziz in 1876, but was deposed in the course of the same year on account of insanity, and was succeeded by his younger brother Abdul Hamid.

Muræ'na, a genus of apodal malacopterygious fishes, type of the family Muræ-nidæ, often considered as belonging to the eels, and resembling the eel in form. They have no pectoral fins, and the dorsal and anal fins are very low and are united. The *M. helena,* or murry, is found in the Mediterranean; it grows to the length of between 4 and 5 feet, and even more, and is excellent eating.

Mural Circle, an astronomical instrument consisting of a telescope attached to a vertical brass circle which turns upon an axis passing through a stone pier. The brass circle revolves exactly in the plane of the meridian, and is carefully divided into degrees and minutes. Attached to the stone pier, and at equal distances apart are six microscopes for the purpose of viewing the graduated circle and determining exactly its position and consequently that of the telescope. It is regarded as the principal fixed instrument in all the great public observatories. Its chief use is to measure angular distances in the meridian, and so to determine the declination of a star, or its distance from the celestial equator. The right ascension of a star being given by the transit instrument (which see), and its declination by this, its exact position is determined.

Murat (mü-rä), Joachim, French marshal, and for some time King of Italy, the son of an innkeeper at Cahors, born in 1771, died 1815. He served in the constitutional guard of Louis XVI.; then entered the 12th Regiment of mounted chasseurs; rose by his zealous Jacobinism to the rank of lieutenant-colonel; was afterwards removed as a terrorist, and remained without employment till his fate placed him in connection with Bonaparte, whom he followed to Italy and Egypt, becoming general of division in 1799. In 1800 he married Caroline, the youngest sister of Bonaparte. He was present at the battle of Marengo, and in 1804 was made marshal of the empire, grand-admiral, and prince of the imperial house. His services in the campaign of 1805 against Austria, in which he entered Vienna at the head of the army, were rewarded in 1806 with the grand-duchy of Cleves and Berg. In the war of 1806 with Prussia, and of 1807 with Russia, he commanded the cavalry, and in 1808 he commanded the French army which occupied Madrid. He anticipated receiving the crown of Spain, Charles IV. having invested him with royal authority; but Napoleon, who destined Spain for his brother Joseph, placed him on the throne of Naples, July 15, 1808. He then took the title of *Joachim Napoleon.* He shared the reverses of the Russian campaign of 1812, and in 1813 again fought for Napoleon, whose cause he deserted after the battle of Leipzig. He took up arms again in 1815 for Napoleon; but being defeated by Generals Neipperg and Bianchi near Tolentino, 2d and 3d May, he was forced to leave Italy, and took refuge in Toulon. After the overthrow of Napoleon he escaped to Corsica, and set sail for the Neapolitan territory with a view to recover his kingdom. He landed at Pinzo on 8th October, but was immediately captured, tried by a court-martial, and shot.

Murato'ri, Ludovico Antonio, Italian historian, born 1672, died 1750. He was successively librarian at Milan and ducal archivist and librarian at Modena. He made many valuable contributions to Italian history, notably Rerum Italicarum Scriptores

ab Anno 500 ad 1500 (twenty-seven vols. folio, 1723–51), Antiquitates Italicæ Medii Ævi (6 vols. 1738–42), Annali d'Italia, &c.

Murchison (mėr'chi-sun), Sir Roderick Impey, Scottish geologist, born at Tarradale, in Ross-shire, 1792; died 1871. He studied at the military college, Great Marlow, and at Edinburgh University; joined the army, and served in the Peninsular war (1807–8). After the peace of 1815 he retired from the army and devoted himself to scientific pursuits, particularly geology, spending many years in the investigation of various parts of England, Scotland, and the Continent. In 1831–32, and again in 1842–43, he was elected president of the Geological Society. By a comparison of specimens of the rocks of Australia with the auriferous rocks of the Ural Mountains, which he had personally examined, he was led, so early as 1845, to predict that gold would be found there. He was one of the founders and most active members of the British Association for the Advancement of Science, and he presided over the meeting of that association at Southampton in 1846. In 1855 he was appointed director of the Geological Survey and of the Royal School of Mines. He was several times elected president of the Royal Geographical Society; after 1862 he was by general consent always re-elected, and he remained president of that society till within a few months of his death. He was D.C.L. of Oxford, LL.D. of Cambridge, and vice-president of the Royal Society. He was made K.C.B. in 1853, and a baronet in 1863. His chief works are Siluria, The Geology of Russia, and numerous contributions to the transactions of the learned societies. He endowed the chair of geology in Edinburgh University.

Murcia (mur'thi-à), a city of Southern Spain, capital of the ancient kingdom and modern province of same name. The city is walled, and the streets are generally broad, straight, and well paved. Among the public buildings the most important is the cathedral, whose principal façade, a combination of Corinthian and Composite architecture, produces a fine effect. It was begun in 1353. The episcopal palace is one of the finest in Spain. There are manufactures of woollens, silk stuffs, linens, &c. Pop. 93,546.—The province formed part of the ancient kingdom of Murcia; area 5970 square miles; pop. 462,182. A considerable portion is composed of ranges of hills, containing mines of copper, iron, lead, and silver, and quarries of marble. There are also extensive plains, which are rendered amazingly fruitful by irrigation. The ancient kingdom, after passing through the hands of the Romans and Goths, was conquered by the Moors in 713, and continued under them till 1240, when it became a dependency of Spain.

Murder, the act of unlawfully killing a human being with premeditated malice, the person committing the act being of sound mind and discretion, and the victim dying within a year and a day after the cause of death administered. In Britain it is the law that every person convicted of murder shall suffer death as a felon. In the United States of America the law recognizes degrees in murder, and in France and some other civilized nations 'extenuating circumstances' are taken into consideration.

Murdoch (mur'doh), William, an inventor, born near Auchinleck, Ayrshire, in 1754. His father was a millwright and miller, and under him William worked till he was twenty-three years of age. He then went to Birmingham, where he obtained employment in the engineering establishment of Boulton and Watt. A demand for Watt's engines was fast rising in the Cornish mines, and Murdoch was soon sent thither to superintend the erection and fittings of these. At Redruth, in 1784, he constructed a model high-pressure engine to run on wheels, the precursor of the modern steam locomotive; a year later he invented the oscillating engine, the system of which is still in use; and the rotary-engine with sun-and-planet circular motion is also his invention. He made many improvements on Watt's engine on the lines of economizing steam and securing simplicity. About the end of the century he was made manager of the works of Boulton and Watt, being afterwards admitted as a partner. In 1803 he constructed a steam-gun; and some time later produced the well-known cast-iron cement made of iron-borings and sal-ammoniac. In 1815 he introduced the hot-water apparatus which, with certain slight modifications, is now so extensively used for heating large buildings and conservatories. Various other inventions of his might be mentioned; but his work as a gas-inventor remains his most conspicuous achievement. In 1792 he first lighted his offices and cottage at Redruth with coal-gas, but it was not till 1798 that he constructed his first extensive apparatus at Birmingham for the

making, storing, and purifying of gas, with a view to the supply of factories. Not long after this the offices at Soho were lighted with gas, and the new illuminant was brought prominently before public notice in 1802, when the exterior of the factory was lighted up in celebration of the Peace of Amiens. His great invention was never patented. He retired from business in 1830.

Mure, William, D.C.L., historian, son of William Mure of Caldwell, an estate on the borders of Renfrewshire and Ayrshire, was born at Caldwell, Renfrewshire, 1799; died 1860. He was educated at Westminster School, the University of Edinburgh, and the University of Bonn. In 1824 and 1825 he contributed to the Edinburgh Review articles on Spanish literature and other subjects. In 1829 he published Brief Remarks on the Chronology of the Egyptian Dynasties; in 1832 A Dissertation on the Calendar of the Zodiac of Ancient Egypt; in 1842 Journal of a Tour in Greece and the Ionian Islands. In 1846 he was elected member of parliament for Renfrewshire, for which county he continued to sit till 1855, when he resigned in consequence of ill health. In the winter of 1847–48 he was elected lord-rector of the University of Glasgow. His leading work, which was left unfinished at his death, A Critical History of the Language and Literature of Ancient Greece, was published in five vols. (1850–57).

Murex, a genus of gasteropod molluscs resembling the whelk; shell spiral, rough, with three or more ranges of spines simple or branched. Murices are remarkable for the beauty and variety of their spines. They were in high esteem from the earliest ages on account of the purple dye that some of them yielded.

Murger (mûr-zhār), Henri, born at Paris 1822, died 1861. He lived a life of extreme privation; formed an informal club or society of unconventional young artists and authors similarly situated which was named 'Bohemia,' and the associates 'Bohemians'—a name famous in general literary history. He contributed a great mass of 'copy' to numerous periodicals, and at last made a reputation by his Scènes de la Vie de Bohême. He also published two volumes of poetry, Ballades et Fantaisies, and Les Nuits d'Hiver; and wrote dramas for the Luxembourg theatre, and tales, &c., for the Revue des Deux Mondes.

Murghab, a river of Asia, which rises in the mountains of Northern Afghanistan, and after a course of 400 miles loses itself in the sands surrounding the oasis of Merv.

Muriatic Acid, the older name for hydrochloric acid (which see).

Mu'ridæ, the family of animals which includes the mice and rats.

Murillo (mụ-rēl'yō), Bartolomeo Esteban, the greatest of Spanish painters, was born at Seville in 1618. He received his first instructions in art from his relation Juan del Castillo. In 1642 he visited

Murillo.

Madrid, and was aided by Velasquez, then painter to the king, who procured him permission to copy in the Royal Galleries. Murillo returned to Seville in 1645, where he commenced that great series of works which have now made his name so glorious. He married a lady of fortune in 1648, which much aided his personal influence, and he succeeded in establishing an academy of the arts at Seville in 1660, and acted as president the first year. He died at Seville 3d April, 1682, in consequence of a fall from a scaffolding at Cadiz, where he was engaged in the church of the Capuchins, painting a large altar-piece of St. Catherine. In his early career he painted many pictures of humble life with much charm of grace and humour; but his most celebrated pictures are of a later period, and treat religious subjects with a mingled idealism and realism, and a richness of colouring which has seldom been attained. Soon after his marriage he gave up his early cold (*frio*) style, and adopted his warm (*calido*) style. He obtained the name of Painter of the Concep-

tion from his fondness for the subject of the Immaculate Conception. About 250 of his pictures are preserved in British and foreign galleries, and in Spanish churches.

Murom, a town in Russia, in the government of Vladimir, 75 miles south-east of the town of Vladimir, on the left bank of the Oka, one of the oldest towns in Russia. Pop. 13,682.

Murphy, ARTHUR, a miscellaneous writer, born in Ireland 1727, died 1805. He was the author of The Grecian Daughter and other plays, highly popular in their day. He published also translations of Tacitus and Sallust, a Life of Garrick, Essay on Johnson, &c. In 1798 he received a pension of £200.

Murrain, a name given in general to any widely prevailing and contagious disease among cattle, though in different localities it is also used as the name of some specific disease.

Murray, the largest river in Australia, rises in the Australian Alps about 36° 40′ S. and 147° E., its sources being partly in N.S. Wales, partly in Victoria; flows for a long distance westward, forming the boundary between the two colonies; then passes into S. Australia, where it takes a southern direction, and falls into the sea through a large shallow sheet of water called Lake Alexandrina. There is a sand-bar at the mouth which impedes navigation, but small steamers ascend the river as high as Albury, 1700 miles from its mouth. Its chief tributaries are the Murrumbidgee, the Darling, and the Lachlan. The Darling before its junction with the Murray may even be considered the main stream.

Murray, DAVID CHRISTIE, novelist, born in 1847; commenced life on the Birmingham press, was connected with London newspapers, and acted as special correspondent during the Russo-Turkish war. He then took to fiction, and has written a number of popular novels, among them Aunt Rachel, The Weaker Vessel, The Way of the World, &c.

Murray, EARL OF. See *Moray*.

Murray, JOHN, eminent London publisher, born 1778 (father's name MacMurray), died 1843. He began business when quite young, early attained success, and became the friend of as well as publisher for some of the chief writers of the day, including Byron, Moore, Rogers, Campbell, Crabbe, Washington Irving, &c. He started the Quarterly Review in 1809. The well-known Handbooks for Travellers were originated by his son.

Murray, LINDLEY, grammarian, born in Pennsylvania, of Quaker parents, in 1745, died 1826. About the age of twenty-one he was called to the bar, and acquired an extensive practice. On the outbreak of the revolutionary war he retired to the country, but four years after engaged in mercantile pursuits, and by the close of the war had realized a competence. In 1784 he went to England, and purchased the estate of Holdgate, near York, where he passed the remainder of his life. He wrote, besides his well-known English Grammar, several works on education and morals.

Murrine (or MURRHINE) **Vases** (*vasa murrhina*), splendid antique vessels which were equally distinguished for the costliness of their material and the beauty of their execution. They were brought, according to Pliny, from Carmania, now Kerman in Persia, and bore an immense price. Vases of this ware were used in Rome as wine-cups, and were believed to have the quality of breaking if poison were mixed with the liquor they contained. There is doubt about the material of these vases, though the probability is they were made of fluor-spar or fluoride of calcium.

Murrumbid'gee, a large river of Australia, in New South Wales, rising in the great Dividing Range, and entering the Murray after a westward course of about 1300 miles; chief tributary, the Lachlan.

Murshidabad', or MOORSHEDABAD, a city of India, Bengal, capital of a district of same name, on the left bank of the Bhagirathi. It was the capital of Bengal till 1772, since which time its historical importance has departed. The city, with its suburb Azimganj on the opposite bank of the river, is the chief centre of trade and manufacture in the district. The industries include the embroidery of fancy articles with gold and silver lace, ivory carving, and the making of musical instruments. Pop. 46,000.—The district of Murshidabad has an area of 2144 square miles and a pop. of 1,226,790.

Murten. See *Morat*.

Murzouk. See *Mourzouk*.

Musa'ceæ, a natural order of endogenous plants, of which *Musa* is the typical genus. It includes the abaca or manilla hemp, the banana, and the plantain.

Musæ'us, an ancient Greek poet, almost fabulous, said by some to be the son of Eumolpus and Selene, by others, of Linus or

Orpheus. He is credited with the mystic and oracular verses of the Eleusinian and other mysteries. The ancients attribute to him many works, of which some verses only have come down to us as quotations in Pausanias, Plato, Aristotle, &c. A later Musæus, who probably lived four or five centuries after Christ, is the author of an erotic poem of the loves of Hero and Leander.

Musäus (mụ-zā′ụs), JOHANN KARL AUGUST, German author, born 1735, died 1787. He studied theology; was master of the pages at the Weimar court, and in 1770 appointed professor in the gymnasium at Weimar. Among his writings, which are characterized by humour, simplicity, and a kindly satire, are Der Deutsche Grandison (The German Grandison), Physiognomische Reisen (Physiognomic Travels), German Popular Tales (Volksmärchen der Deutschen), and a series of tales under the title Straussfedern (Ostrich-feathers).

Musca, a Linnæan genus of dipterous insects, including the flies; now expanded into a family (Muscidæ).

Mus′cæ Volitan′tes (lit. 'floating flies'), in physiology, the name given to ocular spectra which appear like motes or small bodies floating before the eyes. One class of these specks are a common precursor of amaurosis (which see); but another class are quite harmless.

Muscar′dine, a contagious disease in silkworms caused by a fungus.

Muscat, or MASKAT, the chief city of the sultanate of Omán, or Muscat, a seaport on the Indian Ocean, near the east angle of Arabia. The town stands in a hollow, under cliffs 400 feet or 500 feet high. Large buildings are few, and the sultan's palace (a plain edifice), the governor's house, and a few minarets alone rise above the humble mass of flat-roofed huts or houses. The streets are extremely narrow, and the town is one of the hottest places in the world. It is an important centre of trade, exporting coffee, pearls, mother-of-pearl, dye-stuffs, drugs, &c., and importing rice, sugar, piece-goods, &c. Pop. of town and suburbs estimated at 60,000.

Muscatel′, or MUSCADEL, a term for various sweet, strong, and fragrant wines.

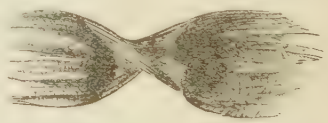
Mus′catine, a city of the United States, in Iowa, on the Mississippi, at the apex of what is called the Great Bend, and in connection with an extensive net-work of railways, 27 miles south-east of Iowa city. Pop. 1890, 11,454.

Muschelkalk (mụsh′el-kálk), a compact hard limestone of a grayish colour found in Germany. It is interposed between the Bunter sandstone, on which it rests, and the Keuper variegated marls, which lie over it, and with which at the junction it alternates, thus forming the middle member of the Triassic system as it occurs in Germany. In England the Keuper rests immediately on the Bunter. It abounds in marine organic remains, its chief fossils being encriuites, ammonites, and terebratulæ.

Musci. See *Mosses.*

Mus′cidæ, a family of two-winged flies, of which the common house-fly (*Musca domestica*) is a familiar example.

Muscle and Muscular Motion. The name *muscle* is applied to those structural elements or organs in animals which are devoted to the production of movements, either of a part of the body, or of the body



A Striped Muscular Fibre with its Sheath.

as a whole. They consist of fibres or bundles of fibres, susceptible of contraction and relaxation, inclosed in a thin cellular membrane. Muscles are composed of fleshy and tendinous fibres, occasionally intermixed, but the tendinous fibres generally

Muscular Fibre separated—A into fibrillæ and B into discs. C is a highly magnified portion of a fibril.

prevail at the extremities of the muscle, and the fleshy ones in the belly or middle part of it. When the fibres of a muscle are placed parallel to each other it is called a *simple* or *rectilinear* muscle; when they intersect and cross each other they are called *compound.* When muscles act in opposition to each other they are termed *antagonist;* when they concur in the same action they are called *congenerous.* Muscles are also

divided into *voluntary* and *involuntary* muscles, the former being those whose movements proceed from an immediate exertion of the will, as in raising or depressing the arm, bending the knee, moving the tongue, &c., while the latter are beyond this control, being the agents in the contraction of the heart, arteries, veins, absorbents, stomach, intestines, &c. When examined under the microscope the fibres of the voluntary muscles (as also those of the heart) are seen to be marked by minute transverse bars or stripes, while those of the involuntary are smooth and regular in appearance. The former is therefore called *striped* or *striated* muscle, the latter *unstriped*, *nonstriated*, or *smooth* muscle. The great property of muscular tissue is the power of responding when irritated. The response is in the form of contraction, that is, when the muscle is irritated or stimulated it responds by shortening itself, so that its ends are brought nearer and it becomes thicker in the middle, its inherent elasticity making it capable of returning to its previous length when the stimulation is withdrawn. By these contractions the muscles are able to do work. The usual stimulation is by nervous action (see *Nerve*), but mechanical means, such as pinching, pricking, &c., electricity, heat, and chemicals also cause irritation. All the muscles are connected with bones not directly but through the medium of tendons. A tendon presents the appearance of a white glistening cord, sometimes flat, but often cylindrical and of considerable thickness. The mass of flesh composing the muscle is called the *belly* of the muscle. One end is usually attached to a bone more or less fixed, and is called the *origin* of the muscle. The other end is attached to the bone meant to be moved by the contraction of the muscle, and is called the *insertion* of the muscle. Involuntary muscle consists of spindle-shaped cells having an elongated nucleus in the centre. They are united in ribbon-shaped bands, and respond much less rapidly than the voluntary to irritations, and the wave of contraction passes over them more slowly.

Muscogees, the Creek Indians. See *Creeks.*

Muscova'do, unrefined sugar; the raw material from which loaf and lump sugar are procured by refining. Muscovado is obtained from the juice of the sugar-cane by evaporation and draining off the liquid part called *molasses.*

Mus'covy. See *Russia.*

Muscovy Duck. See *Musk-duck.*

Muses, in the Greek myth. the daughters of Zeus and Mnemosynē, who were, according to the earliest writers, the inspiring goddesses of song, and according to later ideas divinities presiding over the different kinds of poetry, and over the sciences and arts. Their original number appears to have been three, but afterwards they are always spoken of as nine in number, viz.—*Clio*, the muse of history; *Euterpē*, the muse of lyric poetry; *Thalīa*, the muse of comedy, and of merry or idyllic poetry; *Melpoměnē*, the muse of tragedy; *Terpsichŏrē*, the muse of choral dance and song; *Erăto*, the muse of erotic poetry and mimicry; *Polymnia* or *Polyhymnia*, the muse of the sublime hymn; *Urania*, the muse of astronomy; and *Calliŏpē*, the muse of epic poetry.

Muse'um, a building or apartment appropriated as a repository of things that have an immediate relation to literature, art, or science, and where the objects may be inspected by those who are curious in such matters. Of the museums of Britain the British Museum is the greatest—being perhaps the greatest in the world. Museums illustrative of the industrial arts, though of recent origin, are of great importance. Foremost among institutions of this kind in Britain may be instanced the South Kensington Museum. All the chief cities of Europe and America have valuable museums. In the U. S., the Metropolitan Museum of Fine Art, N. Y.; Museum of F. A., Boston; Museum of F. A., Cincinnati; Corcoran Art Gallery, Wash.; Academy of F. A., Philadelphia; Museum of F. A., St. Louis; the Walter's collection, Baltimore; and the Art Institute, Chicago, are the most important. The National Museum at Washington is a portion of the Smithsonian Institute.

Mushrooms, the common name of numerous cryptogamic plants of the nat. order Fungi. Some of them are edible, others poisonous. The species of mushroom usually cultivated is the *Agaricus campestris*, or eatable agaric, well known for its excellence as an ingredient in sauces, especially ketchup. (See *Agaric.*) Mushrooms are found in all parts of the world, and are usually of very rapid growth. In some cases they form a staple article of food. In Tierra del Fuego the natives live almost entirely on a mushroom, *Cyttaria Darwinii;* in Australia many species of *Bolētus* are

used by the natives, and the *Mylitta australis* is commonly called native bread. *Mushroom spawn* is a term applied to the reproductive mycelium of the mushroom.

Music, any succession of sounds so modulated as to please the ear; also the art of producing such melodious and harmonious sounds, and the science which treats of their properties, dependencies, and relations. Sound is conveyed through elastic media, as the atmosphere or water, by undulations, which may be generated in the medium itself, as by a flute or organ-pipe, or transmitted to it by the vibrations of violin or pianoforte strings or the reeds of a wind-instrument. When the vibrations are fewer than 16 in a second or more than 8192 the sound ceases to have a musical character. The *pitch* or relative height of a tone is determined by the number of vibrations in a given time, the lower numbers giving the grave or deep tones, the higher numbers the acute or shrill tones. The loudness of a tone is determined by the largeness of the vibrations, not their number. The note or musical sound called middle C on the pianoforte is usually assumed by theorists to be produced by 512 vibrations per second, and this was long the pitch recognized in practice as the standard or *concert pitch* useful for the guidance of all musicians. The perpetual striving after increased brilliance of tone led, however, to a gradual heightening of the pitch, and in the course of a century the middle C in France had become 522 vibrations, while in England and Germany it was somewhat higher. Of late years there has been a movement amongst European musicians to lower the pitch to about the French standard, and this lower pitch has been now adopted by many foreign nations.

A note produced by double the number of vibrations required to produce any given note will be found to be in perfect *unison* with it though higher in pitch. Between two such notes there is a gradation by seven intervals in the pitch of tone, more agreeable (at least to modern European ears) than any other, the whole forming a complete scale of music called the *diatonic scale*. The space between the notes sounding in unison is termed an *octave*, and the note completing the octave may become the *key-note* of a similar succession of seven notes, each an octave higher or double the pitch of the corresponding note in the first scale. These seven notes of the diatonic scale are designated by the first seven letters of the alphabet, and each note bears a fixed ratio to the key-note in respect of pitch as determined by the number of vibrations. Thus in the case of a key-note obtained from a vibrating string, its octave is produced by halving the string, which vibrates twice as fast in a given time as the whole string, and the other notes may be obtained by applying reciprocally the ratios given below to the length of the string.

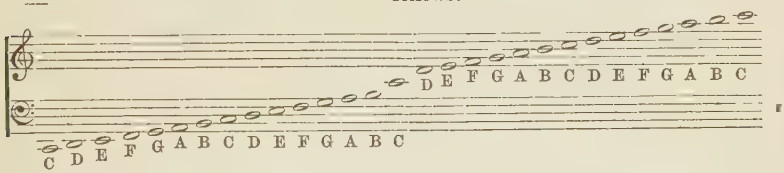
Taking C or Do for our fundamental note we have for our scale—

C	D	E	F	G	A	B	C	D	E	F	G	A	B	C, &c. (Scale in key of C major)
or Do	Re	Mi	Fa	Sol	La	Si	Do	Re	Mi	Fa	Sol	La	Si	Do, &c.
1	$\frac{8}{9}$	$\frac{5}{4}$	$\frac{4}{3}$	$\frac{3}{2}$	$\frac{5}{3}$	$\frac{15}{8}$	2							(Ratio to key-note).

The scale may be extended up or down so long as the sounds continue to be musical. In order to allow reference to be made to the various degrees of scales without reference to the key in which they are pitched the tones composing the octave are known in their ascending order as (1) *tonic* or key-note, (2) *supertonic*, (3) *mediant*, (4) *subdominant*, (5) *dominant*, (6) *superdominant* or *submediant*, (7) *leading note* or *subtonic*, (8) *final note*. The tonic, the subdominant, and the dominant are the governing or emphatic notes of the scale. In the diatonic scale the various notes proceed from the key-note by five *tones* and two *semitones;* the semitones (the smallest intervals recognized in musical notation) occurring between the 3d and 4th and the 7th and 8th notes in the scale. The first four and last four notes, therefore, form a natural division of the octave into two 'tetrachords,' each consisting of two tones and a semitone.

Every sound employed in the art of music is represented by characters called notes on a *staff*—that is, five equidistant horizontal lines on or between which the notes are placed. A note represents a higher or a lower sound according as it is placed higher or lower on the staff. When any note is higher or lower in pitch than can be placed upon the staff short lines called *ledger-lines* are added above or below the staff to indicate the relation of the note to those on the staff. As, however, the multiplication of ledger-lines is liable to become embarrassing to the eye, musicians have endeavoured to overcome the difficulty by the use of more than one staff. The staves are the *bass*,

mean, and the *treble*, but the second is now seldom used. The treble staff, which contains the upper notes, is distinguished by a character called a G or treble *clef* the bass by a character called the F or bass clef and the mean by a character called the C or mean clef The treble and bass clefs only are required for keyed instruments of the pianoforte kind, and when a staff is wanted for each hand they are joined by a brace, the upper staff carrying the notes generally played by the right hand and the lower those played generally by the left, as follows:—



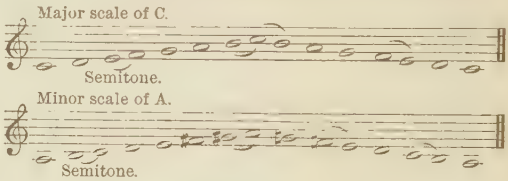
It will be seen that the steps in every diatonic scale must correspond to those of the scale of C, in that the notes composing it stand in the same fixed ratio to the key-note of the scale. In selecting another key-note than C, however, it is necessary to modify some of the natural notes by the insertion of what are called *sharps* or *flats* in order to preserve the required relation and sequence of the intervals (the tones and semitones in their due relative positions) and so produce the major musical progression. The sharp (♯) placed before a note raises the pitch by a semitone, the flat (♭) lowers it by a semitone. A sharp or flat placed at the beginning of a staff affects every note upon the line which it dominates, unless the contrary be indicated by the sign of the *natural* (♮), which restores the note to which it is attached to its normal pitch. In the model diatonic scale given it has been pointed out that there is an interval of a tone between every note, except the 3d and 4th (E and F) and 7th and 8th (B and C), when the interval consists of a semitone. Now if we wish to make G the key-note it is clear that without some contrivance the notation of the scale from G to its octave would throw one of the semitones out of its place — namely, that between E and F, which, instead of being, as it ought to be, between the seventh and eighth, is between the sixth and seventh. It is obvious then that if we raise the F a semitone we shall restore the interval of the semitone to a position similar to that which it held in the key of C. If D be taken as a key-note we shall find it necessary to sharpen the C as well as the F in order to bring the semitones into their proper places. Still proceeding by fifths, and taking A as a key-note, a third sharp is wanted to raise G. We may proceed thus till we reach the scale of C sharp, with seven sharps, which is, however, rarely used. This series of scales with sharps is obtained by taking the dominant, first of the model scale as the key-note and then of the others in succession, and sharpening the fourth of the original scales to make it the seventh of the new. Another series is obtained by taking the subdominant of the model scale as the key-note and lowering its seventh a semitone, making it the fourth of the new scale, or scale of F. Taking the subdominant of the scale (B) as the key-note we require to flatten the E in addition to the B, and so on until we have lowered all the tones in the scale a semitone.

Besides the forms of the diatonic scale, which have an interval of two tones between the tonic and the third, and is called the *major scale*, there are *minor scales* of which the most important kind has an interval of a tone and semitone between its tonic and third, the seventh note being sharpened so as to form a leading note. In the ascending scale, too, the harsh interval of the second between this leading note and the one immediately below it is frequently avoided by sharpening the lower note. In the descending scale the sharps are removed, and the scale is identical with the major, beginning at its sixth and descending an octave. See example at top of next page.

Major and minor scales which, like those given in the example, have the same key signature, are called *relative*. Thus, the major scale of G has for its relative minor the scale of E minor; the major scale of D

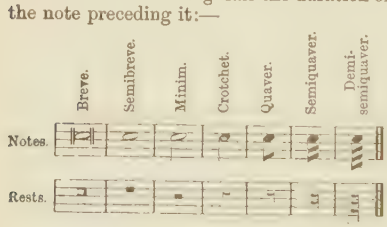
has for its relative minor the scale of B minor; and so on. Each minor scale is also called the tonic minor to the major scale on the same key-note. The tonic minor scale to C major is C minor. One major scale is also said to be related to another when it is raised from its dominant or its subdominant: thus the scales of G and F are held to be nearly related to that of C.

There is still another kind of scale, called the *chromatic* (Greek *chrōma*, colour), because, like colours in painting, it embellishes the diatonic by its semitones. It consists of thirteen notes, and usually ascends by sharps and descends by flats.



Intervals in music (*i.e.* the distance from any one note to any other) are reckoned always upwards and inclusively by the number of names of notes they contain, both limits to the interval being counted. Thus C to E is a third, both C and E being counted in the interval. They are known as major or normal when they are such as would be found in any major scale; as minor when the interval consists of a semitone less than the corresponding major interval; as augmented when consisting of a semitone more than major; as diminished when a semitone less than minor; and as simple or compound according as they fall within or exceed the compass of an octave.

Hitherto notes have been referred to only as representatives of the various sounds with reference to their pitch and distances from each other; but each note serves also to mark the relative duration of the sound it represents. The following are the names and forms of the notes commonly in use, each in succession being half the duration of the note preceding it:—



The stems of the notes may be written upwards or downwards as convenient. In connection with these notes other signs are used still further to indicate duration. A dot placed after a note lengthens it by one-half, two dots by three-fourths. Instead of the dot a note of its value may be written, and a curve, called a *tie*, written over it and the preceding note. Sometimes three notes of equal value have to be played in the time of two, in which case the figure 3 with a curve thrown over it is written above or below the notes. Two *triplets* (as this group is called) may be joined, and the figure 6 surmounted by a curve written over them; they are then performed in the time of four notes of the same form. A sensible interval of time often occurs between the sounding of two notes; this is represented by characters called *rests*, each note having a corresponding rest. A dot may be added to a rest in the same manner as to a note, to indicate an addition of a half to its length. See the example just given, which shows the rests in connection with their corresponding notes.

Every piece of music is divided into portions equal in time, called *measures*, which are separated from each other by vertical lines called *bars*. The term bar is often loosely applied to the measure as well as to the line. The exact length of the measure is indicated by a sign at the beginning of the piece of music. In common time, indicated by a C written after the clef, each measure contains a semibreve, or such notes and rests as make up together its value. Another form of common time, marked with a ¢, contains two semibreves in the measure, or their equivalents in minims, crotchets, &c. Another method of indicating time (or rather more correctly, rhythm) is by figures, in the form of a fraction. The figures of the denominator are either 2, 4, 8, or 16, which (the semibreve being considered the unit) stand for minims, crotchets, quavers, and semiquavers respectively; and the numerator shows the number of these fractional parts of a semibreve in the measure. Besides common time, which may be indicated in two ways, there is triple time, in which a measure is made up of three minims, crotchets, or quavers, which can

only be marked by figures; these are $\frac{2}{2}$, $\frac{3}{2}$, or $\frac{3}{8}$. When two or four measures of triple time are united in one measure the music is said to be written in compound common time, and is indicated by the fractions $\frac{3}{4}$ and $\frac{6}{8}$; rarer examples of compound time signatures are $\frac{9}{4}$, $\frac{9}{8}$, $\frac{9}{16}$, $\frac{12}{8}$, &c. The object of the division of musical passages into measures is to indicate their rhythm. Notes, like words or syllables, are *accented* or *unaccented*. The strongest accent is given to the first note of a measure. In common time of four notes to the measure the third has a subordinate accent, as, though in a less degree, the third measure note in triple time. In compound common time the subordinate accents fall on the first note of the last half of the measure, and in compound triple time on the first note of each of the groups of three of which the measure is composed. When a curve is placed over two notes in the same degree, but not in the same bar, the two notes are played as one of the length of both, and the first note acquires the accent. This displacement of the accent is called *syncopation*. If the curve is written over notes of different degrees it is called a *slur*, and indicates that the notes are to be played or sung smoothly, as if gliding into each other. When an opposite effect is wanted, that is, when the notes are to be produced distinct and detached (*staccato*), a dot is placed over them. The various degrees of loudness and softness which occur in a piece of music are indicated by such Italian words as *forte*, loud; *fortissimo*, very loud; *piano*, soft; *pianissimo*, very soft. In order to save time in writing music various abbreviations are used.

Melody is a particular succession of sounds in a single part, and is produced by the voice or by an instrument. A melody generally consists of an even number of phrases; this number may be four, eight, twelve, or sixteen. A phrase generally corresponds with a line in a verse of poetry. In order to produce an agreeable variety a melody may pass from the form of the scale in which it started to another, generally to the one most nearly related to it, that of the dominant or subdominant. This change from one key into another is called *modulation*. Except in very rare cases a melody ends on its key-note. A musical composition may consist of a series or progression of sounds so connected that several of them may be heard at the same moment. When several voices or instruments produce at the same instant sounds different in pitch, and so combined as to cause an agreeable sensation on the ear, the combination is called *harmonious*, and the proper method of combining these sounds is called the art of *harmony*. The series of notes taken by a single voice or instrument capable of producing only one note at a time is called a *part*. Four parts are by far the most common; but five, six, seven, eight, and even more numerous parts are common in the ecclesiastical compositions and madrigals of the old masters. When two sounds heard together are agreeable to the ear they are called *concordant*, or are said to form a *concord;* if, on the contrary, they grate upon the ear they are said to be *discordant*, or to form a *discord*. Concords are of two kinds—perfect and imperfect. The perfect are the minor fourth, the perfect fifth, and the octave; the imperfect are the major and minor third, and the major and minor sixth. A perfect concord is so called because its conterminate sounds cannot be raised or depressed without becoming discordant. If three or more sounds be heard at the same time the combination is called a *chord*. When a chord is composed of concords only, or in other words when it is composed of a fundamental sound accompanied by its third (major or minor) and its fifth, it is termed a common chord. Of discords the most simple is the minor seventh, or, as it is usually called, the dominant seventh. The different motions of the parts which constitute harmony may be *parallel*, *direct* (or *similar*), *oblique*, and *contrary*. Parallel motion is when two or more parts move in the same direction and remain at the same number of degrees distant; direct or similar motion is when the parts move in the same direction but do not remain at the same distance; oblique motion, either of the parts may be stationary while the rest move in parallel or contrary directions; contrary motion is when the parts approach or recede from each other. It rarely happens that all the parts can move in the same way upwards or downwards together. The rules generally given with respect to the motion and succession of concords are: 1. Octaves and fifths must not be consecutive in parallel motion. 2. Unnecessary and distant skips should be avoided as much as possible, and the chords should be as close and connected as may be. 3. The regular motion of the different parts must be observed: sharp intervals should ascend after the sharp, whilst flat intervals should descend after the flat.

A piece of music harmonized throughout by concords would prove too cloying, and to prevent this discords are introduced. Certain discords are very disagreeable if produced abruptly without preparing the ear to receive them. The preparation of a discord is effected by taking care that the discordant note is heard in the preceding consonance. As the ear would not tolerate a long succession of discords it must be satisfied by a return to concords, which is called the resolution of a discord. This is effected by the part in which the discord appears moving upward or downward to the concordant note in the next chord.

History.—The first public use of music by every people has been in religious rites and ceremonies. The music of the Hebrew worship was of an elaborate character, and was probably derived from Egypt. To the Egyptian priests the Greeks seem also to have owed their ideas of music. It is confidently asserted by some that the Greeks were acquainted with harmony in the technical and musical sense of the word; that the notes A B C D E F G, produced by touching the white keys of the pianoforte, form the common Greek scale; and that their arrangement was copied from the keys of organs, which were derived by us from the Romans through the Greeks, and by the Greeks and Romans from ancient Egypt. The Romans derived all their public music from the Etruscans, and the art was for a long period confined to sacred uses. St. Ambrose (elected Archbishop of Milan 374) may be regarded as the father of the music of the Western Church, as he not only composed and adapted music to the different portions of the church service, but determined the musical idiom in which it was to be cast by selecting a set of simple scales from the exceedingly complicated system of the Greeks. His reputation has, however, been somewhat obscured by the next great musical reformer, Gregory the Great, whose epoch is fully two centuries nearer our own. During this long period the institutions of Ambrose fell into utter confusion, and Gregory, in attempting to restore order, found it necessary to supplement the Ambrosian scales, then first designated *authentic*, by four other subordinate or collateral scales called *plagal*. (See *Gregorian Tones.*) During the four centuries which connect the epoch of Gregory with that of Guido Aretino only two names are worthy of mention —that of Isidore, archbishop of Seville, in whose Sententiæ de Musica we meet, for the first time at least among Christian writers, with the mention of harmony in the modern sense of the term; and that of Hucbald, a monk of St. Armand, Tournay (died 932), who not only mentions harmony, but gives examples of the harmony of his age, *diaphony* or *organum*. The greatest name, however, of the early middle ages is that of Guido Aretino (died 1050). The names which he gave to the notes, *Ut* (for *Do*), *Re*, *Mi*, *Fa*, *Sol*, *La*, are universally used to this day. *Si* was afterwards added by a musician named Le Maire. Within fifty years after the death of Guido a new form of musical art made its appearance, the characteristic of which was the combination of sounds of unequal lengths—music in which two or more sounds succeed one another, while one equal to them in length was sustained. This was called *discantus*, or descant. Descant, it is obvious, would argue the existence of some system of musical proportion among sounds of different duration, and written descant some means of distinguishing such sounds from one another. As might be expected, we hear of both inventions about the same time, the middle of the 12th century, when the treatise on the Cantus Mensurabilis of Franco of Cologne was written, when notes appear first to have been used, and signs to represent the raising and depressing of individual sounds (flats and sharps) first came into being. Late in the 13th century we hear of Adam de la Hale, the Hunchback of Arras as he was called, born in 1240, the composer of several three-part songs, and also of the first comic opera, Li Gieus de Robin et de Marion. The beginning of the next century furnishes us with a remarkable evidence of musical advancement in the word *contrapunctum* (point against point, or as we now say, note against note). This word was first used in the works of Jean de Muris, the greatest theorist of the 14th century. The middle of the century gives us the first example of four-part music, in a mass performed at the coronation of Charles V. of France (1360) and composed by Guillaume de Machault. By this time the organ had reached some degree of mechanical perfection, and several Belgian musicians visiting Rome in the last years of the 14th century carried with them the first masses that had ever been seen there in written counterpoint. In the list of these singers (1380) we find the name of Dufay, whose composi-

tions, though harsh in places to our modern ears, are far superior in design and clearness of texture to anything known to be produced by his predecessors. But the works of Dufay and his contemporaries have been cast into the shade by those of a later generation, of the masters of the new Belgian school, Ockenheim, his contemporaries and pupils. Canon, fugue, and imitation, practised by Dufay, were greatly improved by Ockenheim, among whose pupils was Josquin Deprès, or Des Prez (died 1521). The works of the latter drove those of every other composer from the churches of the Continent, and he was scarcely less successful in productions of a lighter class. His pupils and countrymen were to be found in every court and important city of the Continent, among the musical schools founded by them being those of Naples and Venice. The Italians, however, soon advanced beyond the limits of the art as taught by the Belgians. Constanzo Festa, whose Te Deum has been sung on the election of every pope since his time, was one of the creators of the madrigal; and Giovanni Animuccia is of special interest from his connection with St. Filippo de Neri, to which may be traced the origin of the oratorio. The first Roman school was founded by Claude Gondimel (1510–72), among whose pupils was the greatest composer the world had yet seen, Giovanni Pierluigi Palestrina (1524–94). Musical learning had by this time done its utmost. Every kind of contrapuntal artifice had been brought into play, but no attempt was made to bring out the meaning of the words, and this evil, in conjunction with the frequent use of secular melodies, came under the censure, first of the Council of Basel, and then of the Council of Trent. The committee appointed to carry out the decrees of the latter sought the aid of Palestrina, and his three masses, more particularly the third, the Missa Papæ Marcelli, at once saved music to the church, and established a type which is still recognized. At this period great musical skill and knowledge extended over every part of civilized Europe, the Italians being now, as the Belgians had been before, its chief masters and interpreters, except in England, which in this 16th century had a strictly national school comprising Tallis, Byrd, Farrant, Morley, Ward, Bull, Dowland, and last and greatest, Orlando Gibbons. The close of the century witnessed the birth of the *Opera seria*. Some faint approaches had been made in this direction before, but about the year 1580 a number of amateurs living in Florence, including Bardi, Corsi, Strozzi, Galileo (the father of the astronomer), and others, formed themselves into a society for promoting the closer union of poetry and music by reviving the musical declamation of the Greeks. Their attempts, however, were soon surpassed by the works of Claudio Monteverde, whose Orfeo opened up a new musical world. The first to profit by his discoveries was an artist born some twenty years later—Carissimi, the first great master of the sacred cantata in its various forms. He is said to have been the teacher of Alessandro Scarlatti, the founder of the Neapolitan school. With this school begins modern musical practice: better methods of fingering the keyed instruments, and of bowing the stringed instruments, not to speak of improvements in the instruments themselves; and above all these in importance and difficulty, the art of singing.

The history of the French school proper begins late in the 17th century, with J. B. Lully, born 1633, the composer of many operas, ballets, and occasional pieces, and also of some church music. His music never had great popularity beyond France, but the influence of his example was extensive, and showed itself to some extent in Wise and Blow, and their immediate successors in the English Chapel Royal, the most distinguished of whom was Henry Purcell, the type of English composers. After him Arne, Croft, and Green acquired a certain reputation, but an entirely new era was opened by the advent of Handel, who may be said to belong to England rather than Germany. From about the middle of the last century, when the career of J. Sebastian Bach ended, Germany has indisputably held the highest place in music. Gluck, Haydn, Mozart, Emmanuel Bach, and many others, before and after, owe much of the sweetness which they united with German strength to their study of the Italian masters. But in Beethoven, Weber, Spohr, and Mendelssohn the traces of southern influence are hidden, and new emotional and poetic elements begin to find their way into music. Much, too, as the French musical drama owed in its origin to the Italians, its consolidation was the work of the Germans. Springing up with Lully, a Florentine, carried a step forward by Rameau, a Frenchman, it was

subsequently immensely developed by Gluck and Meyerbeer (Germans), by Cherubini and Rossini (Italians), and by Méhul, Boieldieu, Hérold, and Auber (Frenchmen). Against the best works of the German masters, those of the purely sensuous Italian school, represented by Donizetti, Bellini, and Verdi, have striven with some success for popularity; but the tide of victory seems fairly turned away from the south, and the last-named composer in his later works has shown the force of the German influence. Of the later German school, claiming as its starting-point Beethoven's Ninth Symphony, in which poetry and music form a perfect whole, the chief exponents have been Wagner and Liszt, though with these, as manifesting more or less the same tendencies, must be cited the names of Schubert, Schumann, Mendelssohn, Berlioz, Chopin, and Franz. Opinions may differ as to the extent to which this new development anticipates 'the music of the future,' but there can be no doubt as to the beauty and impressiveness of much of the work of these so-called 'tone-poets.' Among the later composers may be noted the names of Gounod, in France, Rubenstein and Brahms in Germany, Dvorak in Bohemia, Boito in Italy, Grieg in Scandinavia, and Sullivan, Mackenzie, Stanford, and M'Cunn in Britain. All have given proof of power and originality, but it cannot be said that any of them stands in the first rank of composers.

Music of the Spheres. See *Harmony of the Spheres.*

Musk, a substance used in perfumery and medicine, and obtained from several species of deer. (See *Musk-deer.*) A perfume of similar character is also obtained from one or two other animals (see *Musk-rat*); and various animals and plants are noted for emitting a strong musky smell.

Musk-deer, a genus of deer, forming the type of the family Moschidæ, which is essentially distinct from the family of the Cervidæ, or true deers. Their chief habitat is Asia and the islands of the Eastern Archipelago; though one species is found on the west coast of Africa. The typical species of the family is the *Moschus moschifĕrus*, found chiefly in the elevated tablelands of Central Asia, and particularly of Tibet. These animals attain the size of a young roe-deer, and the upper jaw bears prominent canine teeth. The males alone yield the *musk*, which is secreted by an abdominal gland of about the size of a hen's egg. The Tibet musk is most in repute, that known as Russian or Siberian being inferior in quality. Besides its familiar use as a scent, musk

Musk-deer (*Moschus moschifĕrus*).

is employed medicinally as an antispasmodic. There are six or seven other species of *Moschus*, two of which, very diminutive, lack the musk gland.

Musk-duck, a species of duck, often erroneously called the Muscovy-duck (*Cairina moschāta*), a native of America, but now domesticated in Britain. It has a musky smell, and is larger and more prolific than the common duck.

Muske'gon, a city in the State of Michigan, U.S., situated at the upper end of Lake Muskegon. It does a great trade in lumber, the timber being floated down the Muskegon River, and passing through extensive sawing and planing mills here. Pop. 1890, 22,702.

Musket, a hand-gun with which infantry soldiers were formerly armed. When first introduced, early in the 16th century, as a development of the culverin and arquebus, it was discharged by means of a lighted match (hence the name *matchlock* given to it), and was so heavy that it had to be laid across a staff or *rest* to be fired. To make use of it the soldier required to carry a slow-burning match with him, which was apt to be extinguished in wet weather. The wheel-lock followed (16th century), the chief feature of which was a wheel made to revolve by means of a spring, and to cause sparks by friction against a flint. The next improvement was the flint-lock proper (about 1625), in which sparks were produced by one impact of a piece of flint on the steel above the priming powder. Musketeers were soon introduced into all armies, and in the beginning of the 17th century infantry consisted of pikemen and musketeers, and all changes in regard to the relative pro-

portion of the two arms were always in favour of the latter. The flint-lock musket was introduced into the British army towards the end of the 17th century, and was the British musket of the days of the Peninsular war and Waterloo, known familiarly as 'Brown Bess.' It was superseded by the percussion musket in 1842, this musket being in turn superseded by the rifle. See *Rifle.*

Musketoon', a short thick musket, now obsolete, of very wide bore, and sometimes bell-mouthed like the blunderbuss, carrying a ball of from 5 to 7½ ounces.

Musketry, the art of shooting with the musket or rifle. On the introduction of the Minié rifle into the French army, and the subsequent arming of the British troops with the still more precise 'Enfield' (1851), it was deemed necessary to establish a school of musketry at Hythe (1854) with a view to the better instruction of the soldier in the use of his new arm of precision. A great improvement in the shooting of the army was the result. Subsequently a second school was opened at Fleetwood, which, later, was abandoned.

Muskingum, a river in the State of Ohio, U.S., and falling into the Ohio River at Marietta. It is connected with Lake Erie by canal.

Musk-mallow (*Malva moschāta*), a British perennial plant, so named from the peculiar musky odour thrown off by all parts of the plant.

Musk-melon, a delicious variety of melon, named probably from its fragrance.

Musk-ox (*Ovibos moschātus*), an animal intermediate between the ox and sheep. Resembling in general appearance a large goat-like sheep, its body is covered with a coat of tufted hair, brownish in colour and of great length. The hair about the neck and shoulders is so thick as to give the animal a 'humped' appearance; on the rest of the body it is very long, smooth, and flowing, while interspersed among its fibres is a layer of lighter-coloured wool. The musk-ox is active and agile, and climbs mountainous places with ease and dexterity. The horns, broad at the base and covering the forehead and crown, curve downwards between the eye and the ear, and then upwards and slightly backwards. The horns of the female are smaller than those of the male, and their bases do not touch. The ears are short, the head large and broad, the muzzle blunted. The average size of the male is that of a small domestic ox. Gregarious in habits, each herd numbers from twenty to thirty members. The female brings forth one calf in May or June. The food consists of grass, lichens, &c. The musk-ox inhabits the Arctic regions of America north of the 60th degree of latitude. The flesh is pleasant to the taste, though it smells strongly of musk, the odour of which is also diffused from the living animal.

Musk-plant, a little yellow-flowered musky-smelling plant of the genus *Mimulus* (*M. moschatus*), a native of Oregon, but now a common garden plant in Britain.

Musk-rat (*Fiber zibethicus*), an American rodent allied to the beaver, and the only known species of the genus. It is about the size of a small rabbit, and has a flattened lanceolate tail, covered with small scales and a few scattered hairs. Its toes are separate, and provided with a stiff fringe of hair. In summer it has a smell of musk, which it loses in winter. The odour is due to a whitish fluid deposited in certain glands near the origin of the tail. Of considerable commercial importance on account of its fur, the musk-rat, or *musquash* as it is popularly called in America, from its Indian name, is taken in large quantities, the skins of from 400,000 to 500,000 being annually imported into Britain. Very common in North America, the musk-rat lives along the margins of streams, in the banks of which it makes its nest. The musk-rats of Europe, or desmans (*Myogălē moschāta* and *M. pyrenaica*), are aquatic insectivorous animals allied to the shrews and moles, having a long flexible nose, and a double row of glands near the tail secreting a substance of a strong musky smell; found in Southern Russia and the Pyrenees. The musk-rat of India (*Sorex Indicus* or *myosūrus*) is a kind of shrew the size of the common rat.

Musk-tree, Musk-wood, the names of trees and wood that smell strongly of musk. The musk-wood of Guiana and the W. Indies is *Guarea trichilioides;* the musk-tree of Tasmania, *Eurybia argyrophylla.*

Muslin, a fine thin cotton fabric, first made at Mosul or Moussul (whence the name), afterwards in India, and first imported into England about 1670. About twenty years afterwards it was manufactured in considerable quantities both in France and Britain, and there are now many different kinds made, as *book, mull, jaconet, leno, foundation,* &c. Some Indian muslins are of extraordinary fineness, but they can all be rivalled in Europe. *Figured muslins* are

wrought in the loom to imitate *tamboured* muslins, or muslins embroidered by hand.

Muspelheim (mus'pel-him), in the Scand. mythology, the southern part of the universe and the abode of fire, whence sparks were collected to make the stars. At the opposite pole to Muspelheim is Niflheim, where all is frozen, cold, and dark.

Mus'pratt, James Sheridan, English chemist, born 1821, died 1871. He studied chemistry under Thomas Graham both at Glasgow and in London, and afterwards under Liebig at Giessen, in Germany, where he remained several years. In 1850 he established a college of chemistry at Liverpool. His chief work was a Dictionary of Chemistry, but he was also the author of various contributions to scientific journals.

Mus'quash, a name for the musk-rat.

Musschenbroek (mus'*h*en-brök), Pieter van, a Dutch natural philosopher, born at Leyden in 1692. He held professorial chairs successively at Duisburg, Utrecht, and Leyden, where he died in 1761. He visited England, became acquainted with Newton, and was made a fellow of the Royal Society. His principal works are Elementa Physica, Tentamina Experimentorum, Institutiones Physicæ, Compendium Physicæ Experimentalis.

Mussel, a term popularly given to several lamellibranchiate molluscs, section Asiphonida, or those in which 'siphons,' or tubes admitting water to the gills, are absent. The common mussel (*Mytilus edūlis*) forms a typical example of the family Mytilidæ, the shells of which family are equivalve, and have a hinge destitute of teeth. It has a 'beard,' and is the same as the salt-water mussel of New England. The mussel is extensively employed in Scotland as a bait by deep-sea fishermen; and in some districts it is used as an article of food, the best mussels approaching nearly to the oyster in flavour, though occasionally found to be unwholesome. It is cultivated as an article of diet on the European continent, the 'mussel-farms' of the Bay of Aiguillon, near Rochelle in France, forming the most notable example. The family Unionidæ includes the fresh-water or river mussels (*Unio*) and the swan or pond mussels (*Anodon*). The Unionidæ inhabit fresh water exclusively. The pond mussels, of which many species are known, are found in the rivers and lakes both of Europe and America. The hinges of the shell in the genus *Anodon* are destitute of teeth, in the genus *Unio* toothed. The *Unio littorālis* is a familiar species. The *Unio margaritifĕrus,* or pearl-mussel, has attained a reputation from the fact that it has yielded pearls to a considerable value in the Don, Tay, Doon, Forth, Spey, and other British streams.

Musselburgh, a parl. burgh of Scotland, in Midlothian, 6 miles east of Edinburgh, on the Firth of Forth, at the mouth of the Esk, which divides it into two parts, ancient Musselburgh and Fisherrow. It has a bridge, believed to be of Roman erection; and a curious old tolbooth, not now used as a jail. The battle of Pinkie, in 1547, was fought in the vicinity. Together with Leith and Portobello it sends a member to parliament. Pop. 7866.

Musset (mü-sā), Louis Charles Alfred de, French poet, novelist, and dramatist, born at Paris in 1810, died there in 1857. After trying various professions he gave himself up wholly to literature, and in 1829 published a volume of poems called Contes d'Espagne et d'Italie, which had an immediate and striking success. In 1831 appeared Poésies Diverses, and in 1833 Un Spectacle dans un Fauteuil, in which the two chief pieces are a comedy of a light and delicate grace called A quoi Rêvent les Jeunes Filles, and a poem entitled Namouna, written after the manner of Byron. In 1833 he travelled in George Sand's company, but their intimacy soon came to an end. In 1836 was published his Confession d'un Enfant du Siècle, a gloomy novel, containing the analysis of a diseased state of mind, all the phases of which the author had studied in himself. The same settled melancholy also distinguishes his Rolla, Une Bonne Fortune, Lucie, Les Nuits, Une Lettre à Lamartine, Stances à Madame Malibran, L'Espoir en Dieu, and other poems. Among his light and sparkling dramatic pieces are: On ne badine pas avec l'Amour, Les Caprices de Marianne, Il ne faut pas jurer de Rien, &c. In 1848 Musset was deprived by the revolution of the situation of librarian to the ministry of the interior, a sinecure which he had obtained through the favour of the Duke of Orleans; but he was restored to this post under the empire, and was in addition appointed reader to the empress. In 1852 he was admitted a member of the French Academy. De Musset was one of the most distinctive, and, in a certain sense, original of modern French writers. At a time when the battle between the Classicists

and Romanticists was at its height he took sides with neither, but made for himself a style combining the excellences of the two schools. His elder brother Paul was also a writer of some ability, but always overshadowed by the brilliance of Louis.

Mussoo'ree, a town and sanitarium in Dehra Dun district, N.W. Provinces of India, in a picturesque situation among the Himalayas at the height of 7433 feet. Summer pop. about 12,000.

Mussulman. See *Moslem.*

Must, the juice of the grape, which by fermentation is converted into wine.

Mustang, a small wild horse of the South-western United States and Northern Mexico, where it is found in extensive herds, and is captured and tamed as the Indian pony. A reversion from the domesticated stock, it seldom exceeds 13 hands in height, but is a strong and useful animal, and capable of great endurance.

Mustard, the common name of plants of the genus *Sinapis*, nat. order Cruciferæ. The seeds of the *S. alba* and *S. nigra* (white

Mustard (*Sinapis nigra*).

and common mustard), when ground and freed from husks, form the well-known condiment of the shops. The plant is an annual, with stems 3 to 4 feet in height, lower leaves lyrate, upper lanceolate and entire, flowers small and yellow. The preparation from the seeds is often very valuable as a stimulant to weak digestion, and as an adjunct to fatty and other indigestible articles of food. When mixed with warm water and taken in large quantities it acts as an emetic. The tender leaves are used as a salad, and the seeds of *S. nigra* are used in the well-known form of poultice, being applied to various parts of the skin as a rubefacient. *Wild mustard* or *charlock* (*S. arvensis*) is a troublesome weed in cornfields, often making them yellow with its flowers. Its seeds are said to have yielded the first Durham mustard, and they are still gathered to mix with those of the cultivated species.—*Oil of mustard* is an essential oil obtained from the seeds of *S. nigra*. It is very pungent to the taste and smell, and when applied to the skin speedily raises a blister.

Muste'la, the weasel genus of carnivorous animals.

Muster, in a military sense, a review of troops under arms, to see if they be complete and in good order, to take an account of their numbers, the condition they are in, their arms and accoutrements, &c.

Muster-roll, a list of the officers and men in every regiment, troop, or company of soldiers.

Musulman. See *Moslem.*

Musu'rus Pasha, CONSTANTINE, Turkish statesman. Born at Constantinople in 1807, he began his diplomatic career as secretary to the Prince of Samos (1832). When the rebellion in Samos broke out Musurus was chosen to pacify the islanders. He gave them reforms, and a constitution which reunited them to Turkey. In 1840 Musurus was sent as envoy extraordinary and minister plenipotentiary to Greece; in 1848 was promoted to the post of representative of Turkey at Vienna, afterwards becoming envoy extraordinary and minister plenipotentiary to the court of St. James's, retiring in 1885.

Muta Nzige, a large African lake, south-west of and formerly supposed to be part of the Albert Nyanza. It lies immediately under the equator, extending in a direction from N.E. to S.W. from about lat. 0° 25′ N. to nearly 2° S. The island of Usongora occupies a large space in the northern part of the lake, the equator passing through its centre. It is drained by the river Semliki, which enters the Albert Nyanza, as recently discovered by Stanley, who has proposed to give the name Albert Edward Nyanza to the lake.

Mutiny is the unlawful insurrection or revolt of soldiers or seamen against the authority of their commanders; open resistance of officers or opposition to their authority. A mutiny is properly the act of numbers; but by statutes and ordinances for governing the army and navy the acts which constitute mutiny are mul-

tiplied and defined; and acts of individuals, amounting to resistance of lawful commands of officers, are declared mutiny. Officers beginning or joining mutiny are guilty of the offence. Mutiny is punishable in the navy by fine or imprisonment, or both; in the army by death or such other punishment as a court-martial shall direct.

Muttra, a town in India, North-west Provinces, on the Jumna, 36 miles north-west of Agra. It is an old Hindu city, one of the most artistic and interesting in India, and being regarded as the birthplace of Krishna is a great centre of Hindu devotion and place of pilgrimage. Pop. 57,724. —The Muttra district has an area of 1453 sq. miles; pop. 671,690.

Mutual Instruction is the name given to a system of teaching which is not only not mutual, but does not satisfactorily instruct. The object of the method was to carry on schools chiefly by means of the advanced scholars (monitors), and to instruct an uncommon number of pupils at once, with comparatively few masters and little expense. It was found, however, that almost the only recommendation of the plan was its cheapness, and that to give satisfactory instruction even in elementary subjects an experienced teacher is indispensable. See *Bell, Andrew; Lancaster, Joseph.*

Mutule, an ornament in Doric architecture, corresponding to the modillion in the Corinthian and Composite orders, and consisting of a projecting block in the cornice immediately under the corona and perpendicularly above the triglyph. It is often made to slope downwards towards the front, and usually has guttæ or drops underneath.

Muzaffarnagar, a town of India, N.W. Provinces, chief town of district of same name. Pop. 15,080.

Muzia'no, Girolamo, Italian painter, born near Brescia in 1528. After studying the art of Titian he repaired to Rome about 1550, where he soon attracted attention by his landscapes. Subsequently he became an imitator of the style of Michael Angelo, and his picture of the Raising of Lazarus at once established his fame. He also made great improvements in mosaic working. The handsome fortune gained by his talents and industry he devoted in part to assisting to found the Academy of St. Luke at Rome. Died 1590 or 1592. Many of his works are to be met with in Rome.

Muzo, a village of Colombia, South America, N.W. of Bogota, noted for its rich mine of emeralds.

Mwutan Nzige. Same as Albert Nyanza.

Myce'lium, the cellular filamentous structure of fungi. Mycelium consists of whitish anastomosing filaments which spread like a net-work through the substances on which the fungi grow. In the cells of the mycelium reproductive spores are developed.

Myce'næ, an ancient city of Argolis, in the Peloponnesus, about 6 miles north-east of Argos. It is said to have been founded by Perseus, and before the Trojan war to have been the residence of Agamemnon, in whose reign it was regarded as the leading city in Greece. Its ruins are extremely interesting from their antiquity and grandeur. Among them are the Lion's Gate, and the vaulted building of enormous stones called the *Treasury of Atreus*, &c. Dr. Schliemann has carried out excavations here with valuable and interesting results.

Mycŏni (anciently *Myconos*), an island in the Grecian Archipelago, one of the Cyclades, about 21 miles in circuit. The inhabitants are chiefly employed in seafaring pursuits. The capital, Mycŏni, a seaport, contains about 3400 inhabitants. The island produces barley, raisins, and figs, with some wine. Pop. 4466.

Myeli'tis (from the Greek *myelos*, marrow), in medicine, inflammation of the substance of the spinal marrow.

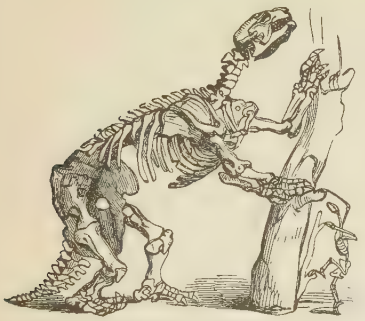
Myg'ale, a genus of spiders, the type of the family Mygalidæ, furnished with four pulmonary sacs and spiracles, four spinnerets, eight eyes, and hairy legs. Their nests, constructed of silk, are built in clefts of rock, trees, &c., and in the ground. The bird-catching spider of Surinam belongs to this species; other larger species frequently prey on small vertebrate animals, not by laying toils for them, but by regularly hunting them. They envelop their eggs in a kind of cocoon.

Mylab'ris, a genus of coleopterous insects nearly allied to the Cantharides (which see), noteworthy because of the use made of some species as a blister-fly.

Mylit'ta, an Assyrian goddess, identified by the Greeks with Aphroditē. She was, as goddess of the moon, the female principle of generation.

My'lodon, a genus of extinct edentate mammalia, allied to the megatherium. Its remains have been found in the upper tertiaries of South America. In size the *Mylodon robustus*—the most familiar species—

attained a length in some instances of 11 feet. Of terrestrial habits, the Mylodon



Skeleton of Mylodon.

obtained the vegetable food upon which it subsisted chiefly by uprooting trees.

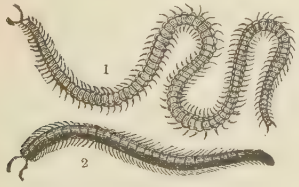
Myol'ogy (Greek, *mys*, muscle, and *logos*, science), the term applied distinctively in anatomical and physiological science to the description of the muscular system, both in its structural and functional aspects.

Myo'pia, the scientific name for short-sightedness. See *Sight, Defects of*.

Myoso'tis, a genus of plants belonging to the Boraginaceæ, and comprising numerous European and Northern Asiatic, a few North American, and three or four Australian species. The *M. palustris* is the well-known forget-me-not. Other species are popularly known as scorpion-grass.

Myox'us, the dormouse genus of animals.

Myriap'oda (Gr. *myrioi*, ten thousand, and *pous, podos*, foot), the lowest class of the higher annulose or anthropodous animals,



Myriapoda.

1, *Geophilus sclehorii*, one of the Chilopoda.
2, *Iulus plicatus*, one of the Chilognatha.

represented by the centipedes, millepedes, and their allies, and resembling the Annelids in the lengthened form and the numerous segments of the body, each segment being provided with one pair of ambulatory feet, whence the name. They have a distinct head, but no division of the body into thorax and abdomen, as in insects. They are therefore of a lower structural type than insects, which in general organization they resemble. No wings are developed. They respire through minute spiracles or pores along the whole length of the body, and are invested with a hard chitinous or horny covering or exoskeleton. This class is divided into two orders, the Chilognatha or Diplopoda, in which the fusion of two rings gives apparently two pairs of feet on each ring; and the Chilopoda, which have two pairs of foot-jaws or maxillipeds, and not more than one pair of feet on each segment.

Myris'tica, the only genus of the natural order Myristicaceæ. *M. fragrans*, a native of the Moluccas, yields the nutmeg of the shops. Other species bear fruit that may be employed as a substitute for nutmeg.

Myrmecoph'aga. See *Ant-eater.*

Myrme'leon. See *Ant-lion.*

Myr'midons, an ancient Greek people of Thessaly, who accompanied Achilles to the Trojan war. They are said to have emigrated into Thessaly under the leadership of Peleus. The term has come to signify the followers of a daring and unscrupulous leader, or the harsh and unfeeling agents of a tyrannical power.

Myrobalan (mī-rob'a-lan), a dried fruit of various species of trees, brought from the East Indies, all slightly purgative and astringent. Myrobalans are used by the Hindus in calico-printing and medicine, and imported into United States for dyers and tanners, especially the latter. They are the produce of several species of *Terminalia* (order Combretaceæ), the chief of which are the belleric myrobalan (*T. Bellerica*) and the chebulic (*T. Chebulica*). Written also *Myrobolan, Myrobolam*, &c.

My'ron, one of the chief sculptors of the older Attic school, who flourished in the middle of the 5th century B.C. The famous Discobolus, or Quoit Player, is the only certainly known work of his a copy of which has come down to our time.

Myrrh, a plant. See *Chervil.*

Myrrh is the name given to a gum resin which exudes from a shrub growing in Arabia and Abyssinia, called *Balsamodendron Myrrha*. It was much esteemed as an unguent and perfume by the ancients, who used it also for embalming and for incense. It is still used as a perfume and for incense,

as also medicinally. By distillation with water myrrh yields a viscid, brownish-green, volatile oil. Myrrh of the best quality is

Myrrh (*Balsamodendron Myrrha*).

known as Turkey myrrh; that of an inferior kind goes under the name of East Indian, being exported from Bombay.

Myrta'ceæ, the myrtle tribe, an extensive and important natural order of polypetalous exogens, mostly inhabiting warm countries, and in all cases either shrubs or trees. They have simple entire leaves, often dotted with resinous pellucid glands and regular, axillary and solitary, or spiked, corymbose, or panicled white, pink, or yellow (never blue) flowers, with numerous stamens. Some yield useful products, such as guavas, cloves, pimento, Brazil-nuts, and cajeput oil. The eucalypts or gum-trees are characteristic of Australia.

Myrtle (*Myrtus*), a genus of plants, natural order Myrtaceæ, consisting of aromatic trees or shrubs, with simple opposite leaves sprinkled with pellucid glandular points, and having axillary or terminal white or rose-coloured flowers. One species, the common myrtle, is a native of the south of Europe and other countries bordering on the Mediterranean. It has been celebrated from remote antiquity on account of its fragrance and the beauty of its evergreen foliage, and by different nations was consecrated to various religious purposes. The brows of bloodless victors were adorned with myrtle wreaths, and at Athens it was an emblem of civic authority. With the moderns it has always been a favorite ornamental plant. It flourishes in the open air only in warm countries.

Myrtle Wax. See *Candleberry*.

Mys'ia, in ancient times the name applied to a district in the north-west of Asia Minor, which varied greatly in extent at different periods.

My'sis, the opossum-shrimps, a genus of crustaceans belonging to the order Stomapoda. They are the chief crustaceans of the Arctic Ocean, and constitute the principal food of the whalebone whale.

Mysole (mī-sōl'), an island in the Indian Archipelago, between Ceram and the north-west extremity of New Guinea. It is about 50 miles long by 15 miles broad, and is inhabited by immigrant Malays and by Papuans. Trepang, ambergris, birds of paradise, pearls, &c., are exported.

Mysor', or **Mysore'**, a principality of Southern India; area, 27,936 square miles. It is inclosed east and west by the Eastern and Western Ghauts, and on the south by the Nilgiri Hills, and consists of table-lands about 2000 feet above the level of the sea. The only river of importance is the Kaveri. There are many large tanks and artificial reservoirs used for irrigation, and the soil produces all the grains and vegetables of the other parts of India and many of the fruits of Europe. Coffee and silk are largely produced, and there are valuable forests. Silk and cotton manufactures are carried on, and there are manufactures of cutlery, copper vessels, and gold and silver lace. Mysor is the capital; Bangalor is the British head-quarters. The revenue and expenditure of the principality are somewhat over £1,000,000. The ruinous misgovernment of the native prince whom the British had set up in Mysor caused his deposition in 1831. The territory continued under British administration till 1881, when it was handed over to a native maharajah educated under the care of the British. Pop. 1891, 4,943,604.

Mysor, the capital of the state of the same name, 250 miles west by south of Madras, stands at an elevation of 2450 feet above the level of the sea. The streets are regular, and the houses intermingled with trees and temples. The fort, separated from the town by an esplanade, is built in the European style. It contains the rajah's palace (which boasts a magnificent chair or throne of gold) and the dwellings of the principal merchants and bankers, and other private edifices. To the south of the fort and about 5 miles from the city is Mysor Hill, on the summit of which is the British residency. Pop. 1891, 74,048.

Mysteries, among the ancient Greeks, and afterwards also among the Romans, secret religious assemblies which no uninitiated person was permitted to approach. They originated at a very early period, and seem to have had a double object—first, that of handing down the traditions relating to the divinities in whose honour they were celebrated; and secondly, that of teaching and practising religious rites. The most important Greek mysteries were—1, The Eleusinian (see *Eleusis*). 2, The Samothracian, celebrated in honour of the Cabiri (see *Cabiri*). 3, The Dionysia, which were celebrated in honour of Bacchus or Dionysus. These were of so licentious a character that they were latterly forbidden as prejudicial to the public peace and morals. This was likewise done in Italy by a decree of the Roman senate in 166 B.C. 4, The Orphic, founded by some who called themselves followers of Orpheus.

Mysteries, a kind of rude dramas which were a favourite spectacle in the middle ages, represented at solemn festivals. The subjects were of a religious character, and the ecclesiastics were at first the performers and authors, the performance being in church. Such plays were called *mysteries* because they taught the mysterious doctrines of Christianity, and the mysteries proper represented scenes from Scripture history, being thus distinct from the *miracle* plays, which dealt with lives of saints, though the distinction is not always attended to. These plays were usually exhibited in a connected series by the guilds or trades of a town. They sometimes took several days to perform. Thus we hear of one which lasted eight days, and contained the greater part of the Scripture history, beginning with the creation and ending with the judgment-day. The Passion of Christ, the Slaughter of the Innocents, &c., were among the subjects represented, the first perhaps more frequently than any other. Corpus Christi day was the chief occasion on which they were performed, and they continued from the 12th to the 16th century. Such plays are still performed at various places in Roman Catholic countries. The passion-play performed at the village of Ober-Ammergau, in Bavaria, every ten years, is a play of this kind. The mysteries were superseded by the moralities (which see).

Mys'ticism, a word of very vague signification, applied sometimes to views or tendencies in religion which aspire towards a more direct communication between man and his Maker through the inward perception of the mind, than that which is afforded through revelation, or to efforts and inclinations by some special and extraordinary means to hold intercourse with divine powers or the inhabitants of higher worlds. According to John Stuart Mill, 'whether in the Vedas, in the Platonists, or in the Hegelians, *mysticism* is neither more nor less than ascribing objective existence to the subjective creations of our own faculties, to ideas or feelings of the mind, and believing that, by watching and contemplating these ideas of its own making, it can read in them what takes place in the world without.' The tendency towards mysticism seems naturally implanted in some natures, and has been observed in all ages. It is a characteristic feature of the great Asiatic religions, Brahmanism and Buddhism. In the Neo-Platonic philosophy it is an important element, as represented by Plotinus (204–269 A.D.). Christianity, in consequence of its special tendency to practical good, as well as of its submission to a system of doctrine expressly revealed, would seem to have afforded little scope for the extravagances of mysticism. It soon, however, made its appearance, forming a kind of profane mixture, and reached its extreme in the writings of the so-called Dionysius the Areopagite. This pseudo-Dionysius obtained an extensive influence, especially through Hugo St. Victor, in the 12th century, and was everywhere held in high respect until the time of the Reformation. In opposition to scholasticism, which laboured in the construction of a systematic and almost demonstrative theology, this system embodied a theology of feeling and immediate illumination, which attached very little importance to intellectual effort, and laid so much the more weight on purification of heart and ascetic morality. Of the most notable of the German mystics in the middle ages were Eckhart and Tauler. In the philosophy of the 15th and 16th centuries, in Paracelsus, Bruno, and others, mysticism took a direction which at a later period gave rise, on the one side, to the alchemists and Rosicrucians, and on the other side to a number of religious sects, of which such men as Jacob Böhmen and Swedenborg may be considered the representatives. The Quietism of Madame Guyon and her adherents (such as Fénelon) in France in the 18th century was a product of the same nature.

Mytens, DANIEL, a Dutch portrait-painter, born at the Hague about 1590. He came to England in the reign of James I., and was named painter to Charles I. But after several years' enjoyment of royal and aristocratic favour he declined before the rising star of Vandyke and returned to Holland. Many of his portraits are at Hampton Court.

Mythology (Greek, *mythos*, a tale or fable, and *logos*, a discourse), the collective name for the whole body of fables, legends, or traditions (myths) that take their rise at an early period of a nation's existence and of its civilization, and that embody the convictions of the people among whom such fables arise as to their gods or other divine personages, their origin and early history and the heroes connected with it, the origin of the world, &c. Such fabulous narratives seem to grow up naturally among all early peoples, and are found among the ruder races at the present day; but the mythologies which have been most studied, and the tales belonging to which are best known, are those of ancient Greece and Rome, Scandinavia, the Hindus, and ancient Egypt. Though speculations as to the origin of mythology have been put forth from a very early period, it is only in recent times, by the help of comparative philology, and by comparing together the myths of different peoples (comparative mythology), that any real advance has been made. Myths are of course believed in by the bulk of the people among whom they are current, and it is only when speculative and reflective spirits arise, and when science and philosophy have made some advances, that their truth is called in question. Thus Zeus, Apollo, Athēnē, Heracles, and the other divinities of ancient Greece, were believed by the bulk of the people to have a real existence, and the stories regarding them were looked upon as true; but even in Greece in early times the absurdities and monstrosities of some of the myths attracted the attention of philosophers, and led to attempts at explaining the stories in such a way as that they should not shock common sense or moral feeling. In doing this three chief systems of interpretation were followed, called respectively by Max Müller the *ethical*, the *physical*, and the *historical*. Those who adopted the first explained that the stories of the power and omniscience of the gods, of their rewarding good and punishing evil, were invented by wise men for the purpose of maintaining law and order in communities—leaving it to be supposed that the immoral representations of the gods were the inventions of poets. The interpreters of the physical (also called the *allegorical*) school held that the myths contained explanations of natural phenomena, or of certain views regarding them, under a peculiar phraseology, which disclosed its hidden wisdom when rightly understood. The third or historical school, identified with the name of Euhemerus, represented the gods as having been originally kings or chiefs, great warriors, sages, or benefactors of the human race, who, being exalted above their fellowmen in life, after their death gradually came to be looked upon as deities.

Perhaps the most common theory of mythology at the present day is one that is based upon comparative philology, and on a comparison of the myths of the different Indo-European nations, and finds its chief exponents and supporters in Max Müllerand the Rev. Sir G. W. Cox. It maintains that all myths have their origin in physical phenomena; but it differs from the older physical or allegorical school in explaining myths as an unconscious product of the popular mind, whereas an allegory (such as the older physical school represented myths to be) is a conscious product of some individual mind. The exponents of this school tell us that in order to understand how myths grow up naturally we must carry our thoughts backwards to an early stage of language and civilization, when men have little or no real knowledge of the external world, when they use themselves as the gauge of all phenomena, and endow every object of sense with a conscious life similar to their own, applying to inanimate objects the language which they use when speaking of their own feelings or actions. Thus in early times men would speak quite naturally of the sun as the child of the night, as the destroyer of the darkness, as the lover of the dawn and as deserting her, as travelling over many lands, as the child of the morning, as her husband, as her destroyer, and so on. This language was natural in early times, and was perfectly understood as descriptive simply of natural phenomena, and nothing else; but in course of time such expressions lost their natural significance, and in this way it is explained that Phœbus Apollo, Endymion, and Phaëthon, for instance, all originally significant epithets applied to the sun from his brilliancy or other character-

istic, became the names of divinities, who were regarded as quite distinct from each other. So Zeus originally meant the sky, Athēnē and Daphnē the dawn, Hermes the wind, and so on. According to this theory the story of Apollo slaying the children of Niobē with his arrows is nothing more than a mythological way of telling how the morning clouds are dispersed before the rays of the rising sun. Heracles or Hercules, again, is the sun labouring throughout his life for the benefit of others: soon after birth he strangles the serpents of darkness, and after performing innumerable toils he dies on the funeral pyre, as the sun sinks in the fiery west. Endymion, as his name implies, is the setting sun, who is courted by the moon, and who sinks to sleep in the west. Some of these identifications of deities with natural phenomena are pretty certain. Zeus, for instance, the supreme god of Greece, the same as the Jupiter of the Romans and the Dyaus of the early Hindus, is clearly the bright sky; and among the Hindus the name of the sky-god Dyaus always retained its meaning of sky, so that Dyaus had only an indistinct personality as a deity. The Hindu Varuna, a sky-god, is clearly the same as the Greek Ouranos, which latter word, besides being the name of a deity, had the ordinary signification of sky or heaven. So the Scandinavian Thor, the god of thunder, can hardly be anything else than thunder personified. Yet as a whole the 'solar theory' cannot be accepted as a key to all mythology. It fails to account for many of the wild and monstrous myths told of deities, of the creation of the world, of the state of the dead, &c., and though it may throw a certain amount of light on the mythology of the Aryan or Indo-European nations, is quite insufficient when myths as a whole are investigated.

Another road has been taken therefore by some recent investigators. Thus Mr. Andrew Lang finds a key to mythology in a study of the myths and mental habits of savage races; he maintains that 'the savage and senseless element in mythology is for the most part a legacy from ancestors of the civilized races who were in an intellectual state not higher than that of Australians, Bushmen, Red Indians, the lower races of S. America, and other worse than barbaric peoples,' and that the monstrous myths current in Greece, Egypt, and India were thus inherited. He points to the currency of such myths among savages at the present day, and to the fact that in general savages are eager to arrive at some explanation of the natural phenomena around them, and are quite satisfied with explanations that to civilized men may seem even imbecile. When a phenomenon presents itself the savage requires an explanation, and that explanation he makes for himself, or receives from tradition, in the shape of a *myth*. But, indeed, no one theory can be expected to explain the origin of all myths, for it is impossible to deny that some may be pure products of imagination, tales invented by early bards or minstrels to beguile a weary hour, while in others fragments of real history may be hidden.

Mytilene, or MITYLENE, a town in the island of Lesbos. See *Lesbos*.

Myxin'idæ, the name applied to the Hagfishes, one of the two families included in the order Marsipobranchii ('pouch-gilled') of the class Fishes. The best-known species is the common or glutinous hag (*Myxinē glutinōsa*), which eats its way into other fishes. See *Hag*.

Mzabites. See *Beni-Mzâb*.

Mzensk (mtsensk). See *Mtzensk*.

N.

N, the fourteenth letter and eleventh consonant of the English alphabet; formed by placing the point of the tongue against the root of the upper teeth and forcing out the breath. It is classed as a nasal, a lingual, and liquid or semi-vowel. In English and most other languages *n* has a pure nasal sound; in French and Portuguese, after a vowel in the same syllable, as *on*, *un*, &c., it has the effect of giving a semi-nasal sound to the vowel preceding, that is to say, the vowel is sounded by an emission of the breath partly through the nose and partly through the mouth. The Spanish alphabet has a character *ñ*, called *n* with the *tilde*, as in *España*, pronounced like *ni* in *onion*, *minion*; *gn* in Italian is pronounced in the same way.

Naas (näs), a town in Ireland, county Kildare, 17 miles south-west of Dublin, an

ancient place, once the residence of the kings of Leinster. Pop. 3808.

Nabathæ'ans, a Semitic race of people who from the 4th century B.C. to about 100 A.D. held a position of importance in Arabia Petræa and the adjacent regions. They were ruled by kings; their capital was Petra, and they carried on a great caravan trade.

Nábha (näb'ha), one of the Punjab native states, India, having an area of 863 square miles, with a population of 261,824. The chief town is Nábha, which has a pop. of 17,116.

Na'bis, a Spartan who succeeded in making himself king of Sparta in B.C. 207, and reigned with great tyranny and cruelty. He was defeated by Philopœmen at the head of the army of the Achæan League, and was at last killed in Sparta by his own allies the Ætolians, whom he had called in to his assistance (192 B.C.).

Nablus, or NABULUS, a town of Palestine, capital of Samaria, 30 miles north of Jerusalem. It is beautifully situated among gardens, orchards, and fertile fields, along the base of Mount Gerizim. It is the principal residence of the descendants of the ancient Samaritans, and has some manufactures and a considerable trade. The chief objects of attraction to pilgrims are the tombs of Joshua and Joseph, and Jacob's Well, 3 miles south, on the road to Jerusalem. Pop. estimated at 13,000.

Na'bob (a corruption of *nawab*, the plural of *naib*, a deputy), in India, formerly the title of a governor of a province or the commander of the troops; borne, however, by many persons as a mere titular appendage.

Nabonassar, a king of Babylon, with whose reign begins an epoch called the *Era of Nabonassar*. It began on the 26th of February, 747 or 746 B.C.

Nacre. See *Mother-of-pearl.*

Na'dir, in astronomy, that point of the heavens which is diametrically opposite to the zenith, or point directly over our heads. The zenith and nadir are the two poles of the horizon.

Nadir Shah, King of Persia, a famous conqueror and usurper, was born in 1688. Having distinguished himself against the Afghans and Turks he acquired the chief power in Persia in 1732, seized the shah, confined and deposed him, and proclaiming his son Abbas, then an infant, in his stead, assumed the title of regent. The young king dying in 1736, he seated himself on the throne as shah. Being invited by some conspirators about the person of the Great Mogul to undertake the conquest of India, he began his march at the head of 120,000 men, and with little resistance reached Delhi in March, 1739. Being exasperated by some tumults on the part of the inhabitants he caused a general massacre, in which upwards of 100,000 persons perished. After this barbarity the victor concluded a peace with the Mogul, whose daughter he married, receiving with her, as a dowry, some of the finest provinces of his empire contiguous to Persia. In this expedition it is supposed that he carried away, and distributed among his officers, valuables to the amount of £112,000,000. On his return he waged war with equal success against neighbouring princes, and at the height of his power his dominions stretched from the Indus and the Oxus to the Euphrates and the Caspian. A conspiracy having been formed against him by the commander of his body-guard and his own nephew, he was assassinated in his tent in 1747, his nephew, Ali Kuli, succeeding to the throne.

Nadiyá, or NUDDEA, a district in the lieutenant-governorship of Bengal, with an area of 3404 square miles. The Padma or Ganges flows along its north-eastern boundary, and other offshoots of the great river skirt or flow through the district. Pop. 2,017,847. The chief town is Nadiyá, on the Bhagirathi, a place of sanctity, and seat of indigenous Sanskrit schools. Pop. 14,105.

Naefels (nā'fels), a village in the canton of Glarus, Switzerland, a few miles north of the capital (Glarus), the scene of one of the most famous of Swiss battles, when 1500 men of Glarus defeated a force of from 6000 to 8000 Austrians (1388). Pop. 3000.

Nævius, CNEIUS, an early Roman poet, born in Campania between 274 and 264 B.C. He wrote tragedies and comedies after the model of the Greek, and an epic poem upon the Punic war. By the introduction of some of the Roman nobility into his comedies he provoked their anger, was banished from the city, and retired to Utica. He died B.C. 204 or 202. Fragments only of his works have come down to us.

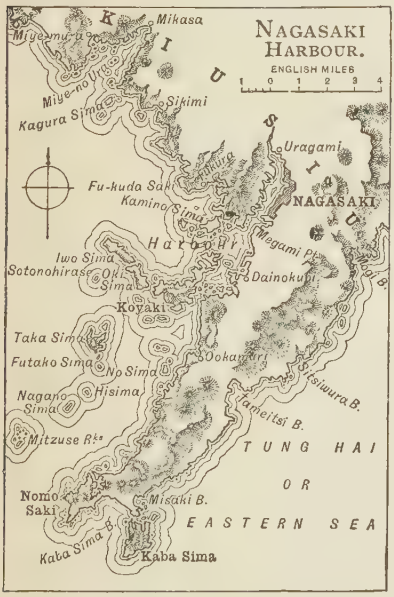
Nævus, or 'MOTHER'S MARK,' a disfigurement which occurs most frequently on the head and trunk, but may also appear on the extremities. It consists essentially of an enlargement of the minute veins, or venous capillaries, which are dilated, and anastomose or unite among themselves to form a vascular patch generally of a deep-red col-

our. The familiar name of 'mother's mark,' or 'longing mark,' is applied from the popular belief that the lesion was the result of fear, fright, unnatural longing, or some such irritation acting upon the mother's constitution, and communicating its effects to the unborn child in the shape of this mark.

Naga Hills, a district of Assam. Area 6400 sq. miles. It consists largely of unexplored mountain and jungle. The tribes are very unruly, and numerous outrages have called for the intervention of the British government. Pop. 94,380.

Nágapatnam. See *Negapatam.*

Nagasa'ki, or NANGASA'KI, a city and port in Japan, on the west coast of the island of Kiusiu, beautifully situated on a peninsula at the extremity of a harbour, affording excellent anchorage, and inclosed by hills, up



the sides of which a portion of the town extends. Nagasaki was one of five Japanese ports opened in 1858 to the British and Americans, having been previously open to the Dutch; and in 1869 it and seven others were opened to foreign nations generally. The exports are copper, silk, camphor, tobacco, porcelain, lackered wares, &c. A dry-dock measuring 460 by 89 feet was opened here in 1879. Pop. 1891, 58,142.

Nagina (*na-gē'na*), a town of Hindustan, in Bijnor district, North-western Provinces. It manufactures cloth, glass-ware, and gun-barrels. It is noted also for its ebony-carving. Pop. 20,503.

Nágpur, or NAGPORE, a town in India, capital of the Central Provinces, and of the division of Nagpur (area, 24,040 square miles; pop. 2,758,056), 440 miles E.N.E. of Bombay. It occupies a low swampy flat, and is little better than a vast assemblage of huts straggling or huddled together in the most irregular manner. The municipal area includes Sitabaldi Hill, where the British residency with a small cantonment is situated. There are other cantonments at Takli, 2 miles distant, and at Kampthi, the chief one, 9 miles distant. The manufactures include cotton and woollen cloths, and utensils of copper, brass, and other alloys. A bed of coal, estimated to contain 17,000,000 tons, at a depth of 200 feet, has been discovered at Nagpur. There is a trade in opium, hemp, and above all, in cotton, for which this is a great mart. Nagpur was formerly the seat of a line of rajahs, which became extinct in 1853, when their territory was annexed to the British dominions. Pop. 1891, 117,014.

Nagy (*nàdy*), a Hungarian word meaning 'great,' occurring in a number of place-names. The chief are: (1) NAGY-KÁROLYI, a town in the north-east of Hungary, with manufactures of woollens, linens, &c. The castle of Count Károlyi is here. Pop. 12,536. —(2) NAGY-KIKINDA, 35 miles south-west of Szegedin. Pop. 19,839.—(3) NAGY-LAK, in the Maros. Pop. 10,646.—(4) NAGY-SZALONTA (*sà-lon'tà*), about 20 miles south-west of Gross-Wardein. Pop. 10,403. See also *Körös.*

Nahum, one of the twelve minor prophets, the author of a book of prophecies included in the Old Testament. His prophecies relate to the destruction of Nineveh, which he describes in vivid colours. The period in which he lived is, however, uncertain, probably 700–600 B.C.

Naia. See *Naja.*

Na'iadæ, a natural order of endogens, consisting of plants living in fresh or salt water in most parts of the world, having cellular leaves with parallel veins and inconspicuous hermaphrodite or unisexual flowers. *Zostera marina* (the grass-wrack) is the most familiar example.

Na'iads, in the Greek mythology, nymphs of fountains and brooks, of similar character

to the dryads, oreads, &c., analogous to the nixies of the northern mythology.

Naïd'idæ, a family or group of water-worms, some of them of common occurrence in the mud of ponds and streams.

Nails (OF ANIMALS), like hairs, are appendages which belong to the category of the exoskeletal elements of the animal frame, or as parts of the skin, of the outer layer of which they are modified appendages. A nail, in fact, is a specialized arrangement of the cells of the epidermis. In man the nails do not inclose the ends of the digits; but in the horse, and 'hoofed' or ungulate quadrupeds generally, the nails assume the form of protective coverings to the digits, and are then known as 'hoofs.' Nails may be produced to form 'claws,' as in birds and carnivorous mammals, while in the sloths they assume a large relative size, and are used as a means in arboreal progression. In the Amphibia—as in some toads, efts, &c.—the nails appear as mere thickenings of the skin at the extremities of the digits. The nails appear about the fifth month of fœtal or embryonic life.

Nails, small pointed pieces of metal, generally with round or flattened heads, used for driving into timber or other material for the purpose of holding separate pieces together. They are of many different lengths and shapes. *Brads* used for nailing floors and ceilings have the head only on one side; the small sharp nails with round flat heads, used by saddlers and upholsterers, are called *tacks;* the small sharp taper nails without heads, used by shoemakers, are called *sprigs;* a variety in which the head is large and the spike small are called *hob-nails;* very large nails are called *spikes.* Until a comparatively recent period almost every kind of nail was produced by hand labour alone, each nail being separately forged from a thin rod of iron. These *wrought* nails are preferable, for many kinds of carpenter work, to those made by machinery. Making of wrought nails retains, in many places, the character of a domestic manufacture, the workman being often assisted by the female members of his family. In 1810 a machine was contrived by which nails could be cut from an iron sheet, and headed at one operation, at the rate of 100 per minute. Since that time great improvements have been made in nail-making machinery, and the method commonly adopted is to cut nails out of sheet-iron of the required thickness, an operation which, by the improved processes, is carried on with great rapidity. The quantity produced in this way is astounding, some mills turning out at the rate of 10 miles of nail-rods an hour.

Nain, a town 8 miles from Nazareth, 42 from Jerusalem, at the foot of Mount Hermon, celebrated as the place where Christ restored a dead man to life. The town has now dwindled into a small hamlet named Nein.

Náini Tál, a hill-station of India, N.W. Provinces, in Kumaon district, picturesquely situated on the banks of a small lake among the spurs of the Himalayas. It is a favourite sanatorium, and the head-quarters of the government of the N.W. Provinces during the hot weather. Pop. 6576; increased to over 10,000 in September.

Nairn, a small county in the north-east of Scotland, on the Moray Firth, with an area of 114,400 acres, of which above 26,000 are under cultivation. The south part of the county is hilly, and composed of gneiss and granite rocks; the lower valleys are occupied by the Old Red Sandstone, and are of a more fertile nature. The principal rivers are the Findhorn and the Nairn, both having their sources in the county of Inverness, and flowing in nearly parallel courses, S.S.W. to N.N.E. The soil is various; along the coast it is generally light and sandy, while further inland it is richer, on a gravelly bottom or stiff clay. Pop. 10,019.—NAIRN, the county town, is a royal burgh and seaport near the mouth of the river of the same name. Its harbour is accessible only to small vessels. Fishing is carried on to a considerable extent, and Nairn is rising into repute as a watering-place. It is one of the Inverness district of burghs. Pop. 4161.

Nairne, CAROLINE OLIPHANT, BARONESS, Scottish poetess, belonging to the Oliphants of Gask, born 1766; married to William Murray Nairne, who in 1824 became Baron Nairne; died 1845. She was the authoress of some exceedingly popular songs, including The Laird o' Cockpen, The Land o' the Leal, The Auld House, &c.

Naja, a genus of serpents, including several that are among the most dangerous of all the venomous snakes. The best-known examples of the genus are *N. tripudians*, the cobra de capello of India, and the *N. haje* of Egypt, which is tamed by native jugglers, and is identified by many writers with the asp employed by Cleopatra to bring about her death. See *Cobra, Asp.*

Nakhichevan (nä-*h*ich'e-vän) is the name of two towns in Russia. The first is situate on the right bank of the Don, in the government of Ekaterinoslav, 7 miles east of Rostoff. It is well and regularly built, chiefly in the oriental style. Pop. 16,584. —2. A town in the government of Erivan, near the left bank of the Aras, 175 miles south of Tiflis, regularly and substantially built. An Armenian tradition says Noah was its founder, and a mound of earth is still pointed out as his grave. Pop. 8772.

Namaq'ualand, GREAT, an extensive region in South Africa, extending along the west coast from the Orange River to Walfish Bay, and inland from the west coast to the Kalahari Desert; estimated area, 100,000 square miles. The greater part of this region is bare and barren, but in part it is favourable for the rearing of cattle. Copper ore appears to be in abundance in several localities. The lion, giraffe, rhinoceros, and hippopotamus, the gemsbok, eland, and other large antelopes are still found here. Germany took possession of Great Namaqualand in 1884. Pop. about 50,000. See *Namaquas.*

Namaqualand, LITTLE, an electoral division of Cape Colony south of the Orange River. It is a dry and barren region, but derives some importance from its copper mines. The chief mining station is Ookiep, 90 miles from Port Nolluth, with which it is connected by rail. Pop. over 10,000.

Namaq'uas, the name given by Europeans to the Hottentot tribes inhabiting Great Namaqualand. They lead a half-pastoral, half-predatory life, yielding allegiance to a number of petty chiefs. Polygamy is universal among them. They are gradually disappearing before the Griquas and other mixed races. Missionaries have been labouring among them for some time.

Namay'cush, the *Salmo namaycush,* a fish nearly allied to the salmon, inhabiting the great lakes and rivers of North America. Good-sized specimens weigh from 20 to 40 lbs., and it is much esteemed for the table.

Names, PERSONAL. It is probable that at first all names were significant. Old Testament names are almost all original, that is, given in the first instance to the individual bearing them, and either originated in some circumstance of birth or expressed some religious sentiment, thus—Jacob (supplanter), Isaiah (salvation of Jehovah), Hannah (favour), Deborah (bee), &c. Neither the Hebrews, Egyptians, Assyrians, Babylonians, Persians, nor Greeks had surnames; and in the earliest period of their history the same may be said of the Romans. In course of time, however, every Roman citizen had three, the *prænomen* or personal name, the *nomen* or name of the gens or clan, lastly, the *cognomen* or family name, as Publius Cornelius Scipio. Conquerors were occasionally complimented by the addition of a fourth name or *agnomen,* commemorative of their conquests, as Publius Cornelius Scipio *Africanus.* Greek names refer to the personal appearance or character; and were often supplemented by the occupation, place of birth, or a nickname. Times of great public excitement have had a very considerable influence in modifying the fashion in names. It is impossible to state with any degree of certainty when the modern system of personal nomenclature became general. Surnames were introduced by the Norman adventurers, but were for centuries confined to the upper classes. They became general in Scotland about the 12th century. In some of the wilder districts of Wales they can hardly be said to have been adopted even yet. The principal sources from which surnames are derived are personal characteristics (Black, Long, Short), rank, profession, or occupation (Bishop, Knight, Miller), localities, or natural objects (Hill, Dale, Stone), and patronymics (Johnson, Wilson, Andrews). The Hebrews had no surnames proper, but to distinguish two men of the same name they used the form Solomon ben David (Solomon son of David). The Welsh use the word ap in the same way; Evan ap Richard (John son of Richard = Prichard). In Britain and most continental nations the wife changes her surname on marriage to that of her husband; in Spain, however, she retains it, while the son may adopt either the paternal or maternal name. It is well settled in the U. States, also in Great Britain, that no process of law is necessary to effect a change of personal name, the names originally not being given by law, but established by usage.

Namur (nä-mür; Flemish, *Namen*), a town of Belgium, capital of province of same name, situate at the confluence of the Meuse and Sambre, and at the foot of a bold promontory on which is a fortress. The strategical position of Namur is highly important, and a powerful citadel now occupies the site of the old castle of its dukes. Sieges and bombardments have robbed the town of

nearly all its ancient buildings, and only a belfry and a monastery, now used as a court of justice, date back to the middle ages. Don Juan of Austria lies buried in the modern cathedral. The town carries on manufactures of cutlery and hardware, &c. Pop. 28,211.—The province, which has an area of 1413 square miles, is well watered by the Meuse, with its affluents the Lesse and the Sambre, and is finely diversified with well-wooded offsets of the Ardennes. About one-half of the whole surface is cultivated. The industry and commerce of the province are largely developed. Its cutlery is particularly famous. Pop. 1892, 336,543.

Nanaimo, a port on the east side of Vancouver Island, where there are important coal-mines.

Nana Sahib, the infamous leader of the Sepoys in the Indian mutiny. He was born in 1825, and adopted by the ruler of the Mahratta state of Bithoor. On the death of the latter the British government refused to recognize Nana's claim to the succession. In May, 1857, there was a mutiny of the Sepoys in Cawnpore, and Nana placed himself at the head of the mutineers. The Europeans in Cawnpore capitulated on a promise that they should be sent down the Ganges in safety. But the men were all shot down and the women and children massacred. (See *Cawnpore.*) Nana was defeated by Sir H. Havelock, and was driven across the frontier into Nepaul. But there all knowledge of him ceases. The general opinion is that he escaped into Central Asia.

Nan-che, a town in China, province of Chekiang, 40 miles west of Yen-chow-foo. It is neat and clean, and about 3 miles in circuit. Pop. about 200,000.

Nancy (nän-sē), a town of France, capital of the dep. Meurthe-et-Moselle, situated in a fertile plain, near the left bank of the Meurthe. It is divided into the old and the new town and several suburbs, and has wide and straight streets, handsome squares, and fine promenades, a triumphal arch, numerous statues, the palace (partly old) of the former dukes of Lorraine, an elegant specimen of Flamboyant Gothic, cathedral, several interesting churches, &c. The Church of St. Epure recently completed is very large, and is accounted one of the finest specimens of modern Gothic in France. Nancy is the see of a bishop, and has a university (with four faculties), a public library, a museum of paintings, botanical gardens, &c. The manufactures consist of broad-cloth and other woollen stuffs; cotton spinning and weaving; hosiery, lace, all kinds of embroidery, stained paper, &c. The trade is extensive. At Nancy in 1477 was fought the great battle between René, duke of Lorraine, and Charles the Bold of Burgundy, who was defeated and slain. From 1870 to 1873 Nancy was occupied by Germans. Pop. 1891, 87,110.

Nandu, the South American ostrich, a bird of the genus *Rhea*. See *Rhea*.

Nangasaki. See *Nagasaki*.

Nankeen', or NANKIN', a sort of cotton cloth, usually of a yellow colour, originally manufactured and imported from Nanking in China. The peculiar colour of these cloths is natural to the cotton (*Gossypium religiosum*) of which they are made. Nankeen is now imitated in most other countries where cotton goods are woven.

Nanking' (that is, 'Southern Capital,' as opposed to Peking, 'Northern Capital'), a city of China, capital of the province of Kiangsu, near the right bank of the Yang-tse-Kiang, 560 miles south by east of Peking, with which it communicates by the Imperial Canal. It is 18 miles in circumference, and is surrounded by a wall generally above 40 feet high. It was at one time the capital of the Chinese Empire; but when the seat of government was transferred to Peking, about the end of the 14th century, it lost its importance and a great part of its population. Although an open river-port few foreigners are resident. It was at Nanking that the British compelled the Chinese to submit to their terms of peace in 1842. Pop. 150,000.

Nanosaurus, NANOSAUR, a fossil lizard-like animal belonging to the group Deinosauria, discovered in North America, and about the size of a cat.

Nansen, FRIDTJOF, Arctic explorer, was born in Norway, Oct. 10, 1861. In 1888–89 he crossed Greenland; on his return he published a number of scientific works. Under the auspices of the Norwegian government, June 24, 1893, he sailed from Christiana in the Fram (a specially built vessel) to attempt the discovery of the North Pole. On March 14, 1895, in lat. 83° 59′, he and Lieut. Johansen proceeded north on sledges, and on April 8th reached 86° 14′ N. and long. 95° E., being 2° 50′ nearer the pole than any previous explorer. On his return he delivered lectures in this country and Great Britain, which were received with enthusiasm.

Nantes, a town of France, on the Loire. The place is noted for the beauty of its

streets and public buildings, and its quays line the banks of the rivers for nearly 2 miles. The public edifices most deserving of notice are the cathedral, in the Flamboyant style, dating from the 15th century, and containing many fine monuments; the castle, an edifice of the 14th century partly modernized in the 16th, with massive round towers; the Hôtel de Ville, the exchange, the theatre, museum of natural history, picture-gallery, the courts of justice, and the Hôtel Dieu or infirmary. The chief industries are shipbuilding, and the manufacture of ships' boilers and machinery, linens, cottons, sailcloth, flannel, chemicals, leather, ropes, soap, &c. Nantes is a flourishing seaport; but part of the foreign trade centres in St. Nazaire, at the mouth of the Loire. Before the conquest of Gaul by the Romans Nantes was a place of some note. For a long time it formed one of the most valuable possessions of the dukes of Brittany; but in 1499 the heiress of the dukedom, Anne of Brittany, having here married Louis XII., it passed with the rest of her possessions to the crown of France. In 1793 it was the scene of some of the most atrocious massacres of the French revolution. Men, women, and children were ruthlessly destroyed by shooting and by drowning. As many as 600 persons are known to have perished in one day, and it is estimated that in the town and surrounding country 30,000 people were destroyed. Pop. 1891, 122,750.

Nantes, Edict of, was signed by Henry IV. in that city, April 30, 1598. It allowed the Protestants the free exercise of their religion, and threw open to them all offices of state. This edict was formally revoked by Louis XIV. on October 20, 1685. As a consequence of this fatal act for France about 400,000 Protestants emigrated to Britain, Holland and other Protestant countries.

Nanticoke, Luzerne co., Pa., 7 m. W. of Wilkesbarre; mining anthracite coal is its chief business. Pop. 1890, 10,044.

Nantucket, an island of Massachusetts, 18 miles south of Cape Cod, 15 miles long and from 3 to 4 miles wide. The town of Nantucket is situated on the north side of the island, and has a deep and secure harbour. The climate is mild in winter and cool in summer, and the island has of late become a favourite summer resort. Pop. in 1890, 3268.

Nantwich, a market town of England, in Cheshire, on the River Weaver, 19 miles south-east of Chester city and 4 miles south-west from Crewe. There is a fine cruciform church. It was once famous for its salt works, but at present its staple manufacture is boots and shoes. Pop. 7495.

Nanuk, the founder of the Sikh religion, born near Lahore in 1469. He taught men to worship the One Almighty Invisible God, to live virtuously, and to be tolerant of the failings of others. He died in 1539.

Naph'tali (Hebrew, 'my wrestling'), the sixth son of Jacob, and the head of one of the twelve tribes. The tribe had its full share in repelling the incursions of the Canaanites during the first centuries of the conquest, but disappears from history when Tiglath-pileser overran the north of Israel and bore away the whole of the population to Assyria. Under the title of Galilee the district occupied by the tribe became in New Testament times more famous than it had ever been before.

Naphtha, a term which includes most of the inflammable liquids produced by the dry distillation of organic substances. *Mineral or native naphtha,* or *petroleum,* is an inflammable liquid which is found in nearly all countries, but especially at Baku, on the Caspian Sea, and in Canada and Pennsylvania. It consists of a mixture of hydrocarbons chiefly belonging to the paraffin series, but it also contains members of the olefine and of the benzene series. *Boghead naphtha,* which is also known as *photogen* and *paraffin oil,* is obtained by distilling certain minerals allied to coal, such as the Torbane Hill mineral or Boghead coal, found at Bathgate in Scotland. *Coal naphtha* is obtained by the distillation of coal-tar. After the *light oil* has been separated it is shaken with caustic soda and afterwards with sulphuric acid. The liquid portion is then run off and rectified. *Shale naphtha* is a mixture of paraffins obtained by distilling bituminous shales. When petroleum is distilled, that portion which distils below 76° C. is sold as *petroleum spirit* or *petroleum ether,* and is used for dissolving india-rubber and making varnishes. The next fraction of the distillate is sold under the names benzoline, paraffin oil, or mineral sperm oil. Benzene occurs in petroleum, but is more abundant in the light oil obtained in distillation of coal-tar. Nitro-benzene is largely employed in the preparation of aniline.

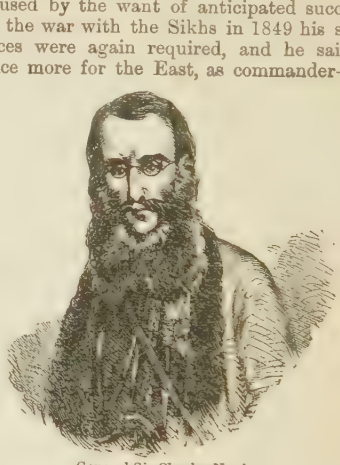
Naphthalene is a crystalline hydrocarbon with an odour of coal-gas, and is occasionally deposited in gas-pipes in cold weather. It

is a very common product of the action of a high temperature upon substances rich in carbon; coal and wood yield it on distillation; marsh-gas, alcohol vapour, and ether vapour deposit crystals of naphthalene when passed through a red-hot tube. When coal-tar is distilled and the temperature has risen to about 200° C., the distilled liquid partly solidifies on cooling from the crystallization of naphthalene. This portion is pressed to expel the liquid part and boiled with alcohol, which deposits the naphthalene as it cools. Naphthalene red was discovered in 1867; it comes into commerce under the name of *magdala* red, in the form of a black-brown crystalline powder.

Naphthyl, a hydrocarbon obtained, together with other products, by heating naphthalene with a mixture of manganese dioxide and sulphuric acid diluted with twice its weight of water. *Naphthol*, or *naphthyl alcohol*, is a derivative of naphthyl. Dinitronaphthol is produced from *naphthol*, and is one of the most beautiful and permanent of yellow dyes, colouring silk and wool in all shades from light lemon to deep gold-yellow.

Napier (nā′pi-ėr), a town of New Zealand, situated on Hawke's Bay, in North Island. The district is principally a grazing one, large quantities of wool being grown. Tinned and frozen meat are also exported. Pop. 7680.

Napier (nā′pi-ėr), Sir Charles James, British general and administrator, born in 1782. He entered the army in 1794, and served in Ireland and Portugal, being present at Coruña, where he was wounded and taken prisoner in 1809. In 1811, when again at liberty, he returned to the Peninsula, and served through the war, being severely wounded in several battles. In 1812 he was made lieutenant-colonel, and in the following year served in the expedition to the Chesapeake. He missed the battle of Waterloo, which took place three days before he reached the scene of action. On the peace a period of inactivity ensued, varied only by his appointment as governor of the island of Cephalonia, and by a short command of the military district of the north of England. In 1837 he was made major-general; in 1838 K.C.B. In 1841 he was appointed to the chief command in the Presidency of Bombay, with the rank of major-general, and was shortly afterwards called to Scinde. Here he gained the splendid victories of Meanee and Hyderabad, and was afterwards made governor of Scinde, which he administered till 1847. He had quarrelled with the directors of the East India Company, but during a panic caused by the want of anticipated success in the war with the Sikhs in 1849 his services were again required, and he sailed once more for the East, as commander-in-



General Sir Charles Napier.

chief of all the forces in India. Before he arrived Lord Gough had brought the Sikh war to a triumphant termination, and no special work remained for Sir Charles Napier to perform. Having returned to England, he died in 1853.

Napier, Admiral Sir Charles, British naval commander, cousin of Sir Charles James and Sir William Napier, was born in 1786; died in 1860. He entered the navy as midshipman in 1799, was promoted lieutenant in 1805, and sent to the West Indies, where he served in the operations against the French. He was promoted commander by Admiral Cochrane in August 1809, and in 1811 was employed in Portugal and along the coast of Southern Italy. In 1813 he was attached to the North American squadron, and in August of the following year he led the expedition up the Potomac river. At the conclusion of the war he was made a C.B. In 1833 he accepted the command of the Portuguese Constitutional fleet, and effected the establishment of Donna Maria on the throne. Returning to England, he was appointed in 1839 to the command of the *Powerful*, and ordered to the Mediterranean, where, on the outbreak of the war between Mehemet Ali and the Porte, and the co-operation of Britain with Russia and

Austria on behalf of the latter power, Sir Charles Napier performed some of his most gallant exploits, including the storming of Sidon and the capture of Acre. Having blockaded Alexandria, he concluded on his own responsibility a convention with Mehemet Ali, by which the latter and his family were guaranteed in the hereditary sovereignty of Egypt on resigning all claim to Syria. On his return to England he was created K.C.B. In 1841 he was elected member for Marylebone. In 1847 he received the command of the Channel Fleet as rear-admiral; and in 1854, on the commencement of the Russian war, he was nominated to the command of the Baltic fleet, being now a rear-admiral. In this capacity he accomplished little beyond the capture of Bomarsund. He sat in parliament as member for Southwark from 1855 till his death. He published a series of Letters to Lord Melville on the State of the Navy; an account of the War in Portugal and of the War in Syria; and numerous contributions to the United Service Magazine.

Napier, JOHN, Laird of Merchiston, near Edinburgh, the inventor of logarithms, was born 1550, died 1617. He was educated at St. Andrews, travelled on the Continent, and ultimately settled down at the family seats of Merchiston, near Edinburgh, and Gartness, in Stirlingshire, as a recluse student. In 1614 he published his book of logarithms (Logarithmorum Canonis Descriptio; Edinburgh, 4to). The invention was very soon known over all Europe, and was everywhere hailed with admiration by men of science. Napier followed it up, in 1617, by publishing a small treatise, giving an account of a method of performing the operations of multiplication and division by means of a number of small rods. These materials for calculation maintained for many years a place in science, and are known by the appellation of Napier's Bones. His eldest son, ARCHIBALD, who succeeded him, was raised to the rank of a baron by Charles I. in 1627, under the title of Lord Napier, which is still borne by his descendants.

Napier, ROBERT CORNELIUS, Baron Napier of Magdala, born in Ceylon Dec. 6, 1810, son of Major C. F. Napier. He entered the Royal Engineers in 1826, and served in the Sutlej campaign in 1845–46, where he was severely wounded. In 1848–49 he served in the Punjaub, and was chief engineer at the siege of Mooltan. He was chief of staff to Sir J. Outram in 1857, and was prominent in the relief of Lucknow at the beginning of the Indian mutiny. In the Chinese war of 1860 he commanded a division with the local rank of major-general. In October 1867 he was intrusted with the command of the Abyssinian expedition, and captured Magdala, April 13th, 1868. He was then made Baron Magdala and G.C.B. In 1870 he was made commander-in-chief in India, with the rank of general, became governor of Gibraltar in 1876, was made field-marshal in 1883, and Constable of the Tower in 1887. He died in 1890.

Napier, SIR WILLIAM FRANICS PATRICK, British officer, brother of Sir Charles James Napier, the conqueror of Scinde, was born in 1785, died in 1860. At the age of fourteen he entered the army, served at the siege of Copenhagen, and with his brothers Charles and George took a distinguished part in the Peninsular campaigns, became lieutenant-colonel in 1813, and colonel in 1830. Some years after the conclusion of peace he commenced his celebrated History of the Peninsular War, the publication of which began in 1828, and extended over the intermediate period till 1840. In 1841 Colonel Napier was advanced to the rank of major-general; he was appointed lieutenant-governor of Guernsey the following year, and in 1848 created a K.C.B. He also wrote History of the Conquest of Scinde, History of the Administration of Scinde, Life of Sir Charles James Napier, &c.

Naples (nā'plz; Italian, *Nap'oli*), a city in Southern Italy, the largest in the kingdom, situated on the northern shore of the beautiful Bay of Naples, about 160 miles from Rome. Its site is magnificent, being on the side of a nearly semicircular bay, partly along the shore, and partly climbing the adjacent slopes, bounded on the one side by the picturesque heights of Posilipo, and on the other by the lofty mass of Vesuvius, while the background is rich in natural beauty. The environs are densely-peopled, towns and villages being numerous round the bay as well as inland. The city is divided into two unequal parts by a steep ridge proceeding from the height on which stands the castle of St. Elmo, and terminated by a rocky islet surmounted by the Castello dell' Ovo. The largest and most ancient part of Naples lies to the S.E. of these heights. This now forms the business quarter, and is intersected from N. to S. by the main street, the Toledo, now Via di Roma.

The western and more modern part of the city is the fashionable quarter, has a superior situation, and commands magnificent views. The chief street in this quarter is the Corso Vittorio Emanuele, 2½ miles in length. The city measures about 3 miles in length by 2 in breadth; the streets are mostly well-paved with lava or volcanic basalt, and the houses are large, lofty, and solidly built, and have flat roofs. There are few remains of ancient times, but there are five castles, S. Dell' Ovo, Nuovo, Del Carmine, Capuano. Elmo, and the gates Porta del Carmine and Capuano, all of mediæval construction. Among the more remarkable public edifices is the cathedral, dating from 1272, a large Gothic building erected on the site of two temples dedicated to Neptune and Apollo. It is held in high veneration in consequence of possessing the relics of St. Januarius or Gennaro. Other edifices are the church De' Santi Apostoli, said to have been originally founded by Constantine the Great on the site of a temple of Mercury, and, though subsequently rebuilt, still very ancient; the church of St. Paul, built in 1817–31 in imitation of the Pantheon at Rome; the Palazzo Reale (Royal Palace, a building of great size in the lower part of the town); the palace of Capo di Monte, situated on a height in the outskirts; the old palace, where the courts of justice now hold their sittings; the Palazzo dei Pubblici Studj, formerly occupied by the university, but now converted into the Museo Nazionale, a museum containing not only a valuable library of 275,000 volumes and many rare MSS., but also the older and more recent collections belonging to the crown, the Farnese collection of paintings and sculpture from Rome and Parma, and an unequalled collection of gems, bronzes, vases, &c., chiefly obtained from the excavations of Pompeii and Herculaneum; numerous theatres, of which that of San Carlo is remarkable for its magnificence, and is one of the largest in existence. Naples has a university, dating from 1224, and attended by over 3000 students; many other educational institutions, and numerous hospitals and charitable foundations. The manufactures, which are numerous but individually unimportant, include maccaroni, woollens and cottons, silks known as *gros* de Naples, glass, china, musical instruments, flowers and ornaments, perfumery, soap, chemicals, machinery, &c. The harbour accommodation has recently been extended, and the trade is important. The exports consist chiefly of bones, cream of tartar, hoops, linseed, hemp, wheat, figs, gloves, liquorice, madder, coral, maccaroni, oil, wine, wool, tallow, rags, and silk, raw, dyed, and manufactured. Naples is one of the most densely

populated cities of Europe, and one of the most peculiar features of the city is its unique population and the universal publicity in which life is passed. In the environs are situated the tomb of Virgil, the ancient ruined cities of Herculaneum and Pompeii, the remains of Roman temples, villas, palaces, and tombs, together with the physical phenomena of Vesuvius. Pop. Dec. 1890, 530,875.

History.—Naples was founded by a Greek colony from the town of Cumæ many centuries before Christ. It took the name of Neapolis ('New City') to distinguish it from a still older Greek city adjoining called *Parthenŏpē*. It passed to the Romans in 290 B.C. In 536 A.D. it was taken by Belisarius, and was pillaged by Totila in 542. In 1130 the Norman Robert Guiscard united the south of Italy and the adjacent island of Sicily into one political unity, and from that period the history of Naples ceases to be the history of a city, but becomes the history of a kingdom forming part of the King-

dom of the Two Sicilies, Naples being recognized as the metropolis. In the year 1189 the kingdom passed from the Norman to the Swabian race. In 1266 Charles of Anjou defeated the Swabians, and was crowned king of the Two Sicilies. The kingdom was ruled by this dynasty until 1441, when it came under the dominion of the princes of Aragon. In the early part of the 16th century it came into the possession of Spain, which governed it by viceroys until 1707. Under the rule of the Spanish viceroys broke out the famous insurrection under Masaniello in 1647. It was similarly governed by Austria until 1735, when it was erected into an independent monarchy in favour of Don Carlos, or Charles of Bourbon. On the latter's accession to the throne of Spain in 1759 he was succeeded by his son Ferdinand IV. In 1798 the French republicans entered Naples, which became a republic; but a loyalist rising led to the return of the king. His reign was again interrupted in 1806, when Napoleon succeeded in placing first his brother Joseph, and on Joseph's removal to Spain his brother-in-law Murat, on the throne of Naples. In 1815 Ferdinand regained his throne, and changed his title to Ferdinand I. Upon his death in 1825 he was succeeded by Francis I., who died in 1830. This prince was followed by his son Ferdinand II., notorious under the nickname of *Bomba*. (See *Ferdinand I.* and *II.*) He died in 1859, and his son Francis II. was his successor. The latter continued the abuses of the old régime, and in the revolution that broke out in 1860 under the guidance of Garibaldi he was deposed, and Naples and Sicily were added to the Kingdom of Italy.

Naples, Bay of (anciently, *Crater Sinus*), on the west coast of Italy, in the Mediterranean, extending for about 35 miles from the Capo di Miseno, its N.W. boundary, to the Punta della Campanella, its S.E. limit. It is separated from the open sea by the islands of Procida, Ischia, and Capri. Its shores have for ages been the scene of powerful volcanic agency, and the scenery has long been celebrated for its beauty and grandeur. Mount Vesuvius is the most striking and distinctive feature.

Naples-yellow, a pale golden-yellow pigment composed of the oxides of lead and antimony. It is employed not only in oil-painting, but also for porcelain and enamel. Chromate of lead is sometimes used as a substitute for this colour

Napoleon I., Emperor of the French, was born August 15, 1769, at Ajaccio, Corsica, and was the son of Charles Bonaparte, an advocate, and of Letizia Ramolino. (See *Bonaparte.*) In his tenth year he was sent to the military school of Brienne, and after a short time spent at that of Paris he received, in 1785, his commission as lieutenant of artillery. During the development of the revolution Napoleon took the popular side, but in a quiet and undemonstrative way. In 1792 he became captain of artillery, and in 1793 he was sent, with the commission of lieutenant-colonel of artillery, to assist in the reduction of Toulon, then in the hands of the British. The place was captured (19th December) entirely through his strategic genius; and in the following February he was made a brigadier-general of artillery. In 1795, when the mob of Paris rose against the Convention, Napoleon was made commander of the 5000 troops provided for its defence. He had only a night to make arrangements, and next morning he cleared the streets with grape, disbanded the national guard, disarmed the populace, and ended the outbreak. On the 9th March, 1796, he married Joséphine Beauharnais, and soon after he had to depart to assume the command of the army of Italy against the forces of Austria and Sardinia. After a series of victories, culminating in that of Lodi (10th May), Naples, Modena, and Parma hastened to conclude a peace; the pope was compelled to sign an armistice; and the whole of Northern Italy was in the hands of the French. Army after army sent by Austria was defeated (at Roveredo, Bassano, Arcole, Rivoli, &c.); Napoleon carried the war into the enemy's country; and by the Peace of Campo Formio, which followed (Oct. 17, 1797), Austria ceded the Netherlands and Lombardy, and received the province of Venetia. The pope had previously been forced to cede part of his dominions.

In December, 1797, Napoleon returned to Paris. About this time the Directory determined to invade Egypt, as a preliminary step to the conquest of British India. Napoleon was put in command of the expedition, and on the 1st July, 1798, he landed at Alexandria. This city fell on the 4th July, and Cairo was taken on the 24th, after the sanguinary battle of the Pyramids. On Aug. 4th Nelson annihilated the French fleet in the Bay of Aboukir. All means of return to Europe for the French were

thus cut off; but Napoleon having suppressed with rigour a riot in Cairo, advanced to attack the Turkish forces assembling in Syria. He took El Arish and Gaza, and stormed Jaffa. But after sixty days' siege he was compelled to abandon the attempt to capture Acre, which was defended by a Turkish garrison under Djezzar Pasha, assisted by Sir Sydney Smith and a small body of English sailors and marines. He re-entered Cairo on the 14th June, 1799, and on the 25th July attacked and almost annihilated a Turkish force which had landed at Aboukir. On the 22d August he abandoned the command of the army to Kléber, and embarking in a frigate landed at Fréjus, 9th October, having eluded the English cruisers. He hastened to Paris, secured the co-operation of Moreau and the other generals then in the capital, and abolished the Directory on the 18th and 19th Brumaire (9th–10th November). A new constitution was then drawn up chiefly by the Abbé Siéyès, under which Napoleon was made first consul, with Cambacérès and Lebrun as second and third consuls. From this time he was virtually ruler of France.

Napoleon's government was marked by sagacity, activity, and vigour in the administration of civil affairs, and so far was highly beneficial to France. But war was his element, and in 1800 he resolved to strike a blow at Austria. Having executed a daring march into Italy across the Great St. Bernard, he defeated the Austrians at Marengo, and after the decisive battle of Hohenlinden Austria obtained peace by the Treaty of Lunéville, 1801. Treaties were subsequently concluded with Spain, Naples, the pope, Bavaria, Portugal, Russia, Turkey, and finally, on the 27th March, 1802, the treaty known as that of Amiens was signed by Britain. In 1802 Napoleon was proclaimed by a decree of the senate consul for life, and in 1804 he had himself crowned as emperor, upwards of 3,000,000 votes of the people being given in favour of this measure. To this period belongs the famous body of laws known as the *Code Napoléon*. See *Code*.

In 1803 war had again broken out with Britain, and Napoleon collected an army and flotilla which were to invade England. In 1805 Britain, Russia, Austria, and Sweden united against Napoleon, who marched at once across Bavaria at the head of 180,000 men, and compelled the Austrian General Mack to capitulate at Ulm with 23,000 men (20th October), the day before Nelson's great victory at Trafalgar. On the 13th November he entered Vienna, and on December 2, having crossed the Danube, he completely routed the allied Russian and Austrian armies at Austerlitz. The Austrian emperor instantly sued for peace, giving up to France all his Italian and Adriatic territories. In February, 1806, a French army occupied the continental part of the Neapolitan states, of which Joseph Bonaparte was declared king on the deposition of their former sovereign. Another brother of the emperor, Louis, became King of Holland. Various districts in Germany and Italy were erected by the conqueror into dukedoms and bestowed upon his most successful generals. This brought him into collision with Prussia, and war was declared on 8th October. On the 14th Napoleon defeated the enemy at Jena, while his general, Davoust, on the same day gained the victory of Auerstädt. On the 25th Napoleon entered Berlin and issued the celebrated Berlin Decrees, directed against British commerce. He then marched northwards against the Russians, who were advancing to assist the Prussians. At Pultusk (28th December) and at Eylau (8th February, 1807) he met with severe checks; but on the 14th June was fought the battle of Friedland, which was so disastrous to the Russian arms that Alexander was compelled to sue for an armistice. On the 7th July the Peace of Tilsit was concluded, by which the King of Prussia received back half of his dominions, and Russia undertook to close her ports against British vessels. The Duchy of Warsaw was erected into a kingdom and given to the King of Saxony; the Kingdom of Westphalia was formed and bestowed upon Jérôme, Napoleon's youngest brother; and Russia obtained a part of Prussian Poland, and by secret articles was allowed to take Finland from Sweden. As Portugal had refused to respect the Berlin Decrees, Napoleon sent Junot to occupy Lisbon (30th November, 1807). The administrative affairs of Spain having fallen into confusion, Napoleon sent an army under Murat into that kingdom, which took possession of the capital, and by the Treaty of Bayonne Charles IV. resigned the Spanish crown, which was given to Joseph Bonaparte, Murat receiving the vacant sovereignty of Naples. The great body of the Spanish people rose against this summary disposal of the national crown, and Britain aided them in their resistance. Thus was commenced the Peninsular war, which lasted

seven years. A French squadron was captured by the British at Cadiz (June 14, 1808); General Dupont surrendered at Baylen with 18,000 men (22d July); Junot was defeated by Sir Arthur Wellesley (Wellington) at Vimeira (21st August). But Napoleon rushed to the scene of action in October at the head of 180,000 men, and entered Madrid in spite of all resistance by the Spaniards on the 4th December. The British troops, now under Sir John Moore, were driven back upon Corunna, where they made a successful stand, but lost their general (16th January, 1809). In the meantime Austria again declared war and got together an army in splendid condition under the Archduke Charles. Napoleon hurried into Bavaria, encountered the archduke at Eckmühl (22d April), and completely defeated him; on the 13th May he again entered Vienna. On May 21st and 22d he was himself defeated at Aspern and Esslingen; but on the 6th July the Austrians were crushed at Wagram, which enabled Napoleon to dictate his own terms of peace; these were agreed to on the 14th October at Schönbrunn. On his return to Paris Napoleon was divorced from Joséphine, who had borne him no children, and on the 2d April, 1810, he was married to the Archduchess Maria Louisa of Austria. The fruit of this union was a son. (See next article.)

The years 1810 and 1811 were the period of Napoleon's greatest power. On the north he had annexed all the coast-line as far as Hamburg, and on the south Rome and the southern Papal provinces. But now the tide began to turn. Russia found it impossible to carry out the continental blockade and give due effect to the Berlin decrees; so in May 1812 Napoleon declared war against that country, and soon invaded it with an army of about 500,000 men. The Russians retired step by step, wasting the country, carrying off all supplies, and avoiding as far as possible general engagements. The French pushed rapidly forward, defeated the Russians at Borodino and elsewhere, and entered Moscow only to find the city on fire. It was impossible to pursue the Russians farther, and nothing remained but retreat. The winter was uncommonly severe, and swarms of mounted Cossacks incessantly harassed the French, now sadly demoralized by cold, famine, disease, and fatigue. Of the invaders only about 25,000 left Russia. Napoleon immediately ordered a fresh conscription, but the spirit of Europe was now fairly roused. Another coalition, consisting of Prussia, Russia, Great Britain, Sweden, and Spain, was formed, which early in 1813 sent its forces towards the Elbe. Napoleon had still an army of 350,000 in Germany. He defeated the allies at Lützen, at Bautzen, and at Dresden; but the last was a dearly-bought victory for the French, who were now so outnumbered that their chief was compelled to fall back on Leipzig. There he was completely hemmed in, and in the great 'Battle of Nations,' which was fought on the 16th, 18th, and 19th October, he was completely defeated. He succeeded in raising a new army, and from January to March, 1814, he confronted the combined hosts of the allies. But numbers were against him; and Wellington rapidly advanced upon Paris from the south. On the 30th March the allies captured the fortifications of Paris, and on the 31st the Emperor Alexander and Wellington entered the city. On the 4th April Napoleon abdicated at Fontainebleau. He was allowed the sovereignty of the island of Elba, with the title of emperor and a revenue of 6,000,000 francs, and Louis XVIII. was restored. After a residence of ten months he made his escape from the island, and landed at Fréjus on the 1st March, 1815. Ney and a large part of the army joined him, and he made a triumphal march upon Paris; but it was mainly the army and the rabble that he now had on his side. The allied armies once more marched towards the French frontier, and Napoleon advanced into Belgium to meet them. On the 16th June he defeated Blücher at Ligny, while Ney held the British in check at Quatre-Bras. Wellington fell back upon Waterloo, where he was attacked by Napoleon on the 18th, the result being the total defeat of the French. The allies marched without opposition upon Paris. Napoleon abdicated in favour of his son, and tried to escape from France, but failing he surrendered to the captain of a British man-of-war. With the approval of the allies he was conveyed to the island of St. Helena, where he was confined for the rest of his life. He died in May 1821, and was buried in the island, but in 1840 his remains were transferred to the Hôtel des Invalides at Paris.

Napoleon II., Napoleon François Joseph Charles Bonaparte, only son of the preceding, was born in Paris 1811; died at Schönbrunn 1832. In his cradle he was proclaimed King of Rome. On the

first abdication of the emperor he accompanied his mother, Maria Louisa of Austria, to Vienna. His title there was Duke of Reichstadt. He never assumed the title of Napoleon II.; but on the accession of his cousin Louis Napoleon in 1852, some title being necessary, the late emperor took that of Napoleon III., which being recognized by the governments of Europe, implied the recognition of the former title.

Napoleon III., CHARLES LOUIS NAPOLEON BONAPARTE, Emperor of the French, was born at Paris 1808; died at Chiselhurst, England, 1873. He was the youngest son of Louis Bonaparte, brother of Napoleon I. and king of Holland, and of Hortense de Beauharnais. His early life was spent chiefly in Switzerland and Germany. By the death of his cousin the Duke of Reichstadt (Napoleon II., see above) he became the recognized head of the Bonaparte family, and from this time forward his whole life was devoted to the realization of a fixed idea that he was destined to occupy his uncle's imperial throne. In 1836 an attempt was made to secure the garrison of Strasburg, but the affair turned out a ludicrous failure. The prince was taken prisoner and conveyed to Paris, and the government of Louis Philippe shipped him off to the United States. The death of his mother brought him back to Europe, and for some years he was resident in England. In 1840 he made a foolish and theatrical descent on Boulogne; was captured, tried, and sentenced to perpetual confinement in the fortress of Ham. After remaining six years in prison he escaped and returned to England. On the outbreak of the revolution of 1848 he hastened to Paris, and securing a seat in the National Assembly, he at once commenced his candidature for the presidency. On the day of the election, 10th December, it was found that out of 7,500,000 votes Louis Napoleon had obtained 5,434,226; Cavaignac, who followed second, had but 1,448,107. On the 20th the prince-president, as he was now called, took the oath of allegiance to the republic. He looked forward to a higher position still, however, and pressed for an increase of the civil list from 600,000 francs first to 3,000,000, then to 6,000,000, with his term of office extended to ten years, and a residence in the Tuileries. At last, on the evening of the 2d December, 1851, the president declared Paris in a state of siege, a decree was issued dissolving the assembly, 180 of the members were placed under arrest, and the people who exhibited any disposition to take their part were shot down in the streets by the soldiers. Another decree was published at the same time ordering the re-establishment of universal suffrage, and the election of a president for ten years. When the vote came to be taken, on the 20th and 21st of the same month, it was discovered that 7,439,216 suffrages were in favour of his retaining office for ten years, with all the powers he demanded, while only 640,737 were against it. As soon as Louis Napoleon found himself firmly seated he began to prepare for the restoration of the empire. In January 1852 the National Guard was revived, a new constitution adopted, and new orders of nobility issued; and at last, on the 1st December, Louis Napoleon Bonaparte was proclaimed emperor under the title of Napoleon III. On the 29th January, 1853, the new sovereign married Eugénie Marie de Montijo, countess de Teba; the result of this union being a son, Napoleon-Louis, born 16th March, 1856. In March 1854 Napoleon III., in conjunction with England, declared war in the interest of Turkey against Russia. (See *Crimean War.*) In April 1859 war was declared between Austria and Sardinia, and Napoleon took up arms in favour of his Italian ally, Victor Emanuel. The allies defeated the Austrians at Montebello, Magenta, Marignano, and Solferino. By the terms of the Peace of Villafranca Austria ceded Lombardy to Italy, and the provinces of Savoy and Nice were given to France in recognition of her powerful assistance (10th March, 1860). In 1860 the emperor sent out an expedition to China to act in concert with the British; and in 1861 France, England, and Spain agreed to despatch a joint expedition to Mexico for the purpose of exacting redress of injuries, but the English and Spaniards soon withdrew. The French continued the quarrel, and an imperial form of government was initiated, Maximilian, archduke of Austria, being placed at its head with the title of emperor. Napoleon, however, withdrew his army in 1867, and the unfortunate Maximilian, left to himself, was captured and shot. On the conclusion of the Austro-Prussian war of 1866 Napoleon, jealous of the growing power of Prussia, demanded a reconstruction of frontier, which was peremptorily refused. The ill-feeling between the two nations was increased by various causes, and in 1870, on the Spanish crown

being offered to Leopold of Hohenzollern, Napoleon demanded that the King of Prussia should compel that prince to refuse it. Notwithstanding the subsequent renunciation of the crown by Leopold war was declared by France (19th July). (See *Franco-German War.*) On the 28th July Napoleon set out to take the chief command, and on 2d September the army with which he was present was compelled to surrender at Sedan. One of the immediate consequences of this disaster was a revolution in Paris. The empress and her son secretly quitted the French capital and repaired to England, where they took up their residence at Camden House, Chislehurst. Here they were rejoined by the emperor (who had been kept a prisoner of war for a short time) in March 1871, and here he remained till his death. His only child, the prince imperial, who had joined the British army in South Africa as a volunteer, was killed by the Zulus 2d June, 1879.

Napoleon, a card game played by two or more players, each of whom receives five cards. It is usually played for money, a fixed stake per trick being agreed on. When the player at the left of the dealer examines his cards he either declares to win one, two, three, four, or five tricks -the latter called 'going nap;' or he 'passes,' *i.e.* declines to play, being accordingly out of that game. If he declares any number of tricks less than five, the next player in order has an opportunity of declaring or passing, the one who declares the highest number of tricks being always the one who has to play. The first card played determines that trumps are to be of that suit for the game. Should the player declaring, succeed in winning his number of tricks he pockets a corresponding sum from each player, and the game recommences; should he fail he has to pay to each player a sum corresponding to the number of tricks.

Napoléon-Vendée. See *Roche-sur-Yon.*

Nap'oli de Romania, or NAUPLIA, a seaport town of Greece, 28 miles S.S.W. of Corinth. The Bay of Nauplia has excellent anchorage, and there is a good harbour for small vessels. Pop. 4598.

Napu, a very small, peculiarly elegant musk-deer (*Tragŭlus napu*) inhabiting Java and Sumatra.

Narbada. See *Nerbudda.*

Narbonne (Latin, *Narbo Martius*), a town of Southern France, department of Aude. It has dark, winding streets, a fine church (the choir only completed), a Gothic structure founded in 1272; and a castellated town-hall, formerly an archbishop's palace. The manufactures are not important. The honey of Narbonne is celebrated. Narbonne was the first colony which the Romans founded beyond the Alps. It became the capital of Gallia Narbonensis, but is very poor in Roman remains. Pop. 25,067.

Narcis'sus, according to Greek mythology the son of the river-god Cephissus. The young Narcissus was of surpassing beauty, but excessively vain and inaccessible to the feeling of love. Echo pined away to a mere voice because her love for him found no return. Nemesis determined to punish him for his coldness of heart, and caused him to drink at a certain fountain, wherein he saw his own image, and was seized with a passion for himself of which he pined away. The gods transformed him into the flower which still bears his name.

Narcis'sus, an extensive genus of bulbous plants, mostly natives of Europe, nat. order Amaryllidaceæ. The species are numerous, and from their hardiness, delicate shape, gay yellow or white flowers, and smell, have long been favourite objects of cultivation, especially the daffodil (*N. Pseudonarcissus*), the jonquil (*N. Jonquilla*), polyanthus narcissus (*N. Tazetta*), and white narcissus (*N. poeticus*). Some of the more hardy species grow wild in our woods and under our hedges.

Narcot'ic, derived from a Greek term signifying numbness or torpor, is the name given to a large class of substances which, in small doses, diminish the action of the nerves. Most narcotics are stimulating when given in moderate doses; in larger doses they produce sleep; and in poisonous doses they bring on stupor, coma, convulsions, and even death. Opium, hemlock, henbane, belladonna, aconite, camphor, digitalis, tobacco, alcohol, leopard's-bane, and a variety of other substances, are narcotics.

Narcotine, an alkaloid contained in opium to the amount of 6 or 8 per cent. It is poisonous in large doses, about 45 grains being sufficient to kill a cat.

Nard. See *Spikenard.*

Nardò, a town of S. Italy, prov. Lecce. Pop. 8662.

Nardoo (*Marsilia macrŏpus*), a clover-like acotyledonous plant of Australia, occupying extensive tracts of inundated land. Its dried spore-cases are eaten by the natives.

Nares, SIR GEORGE STRONG, K.C.B., F.R.S., born 1831. Entered the navy and took part in the Arctic expedition of 1852-

54. From 1872 to 1874 he commanded the *Challenger* during her scientific expedition, and in 1875 was first in command of the North Polar expedition. He afterwards was engaged in a survey of the South Pacific. He is the author of Seamanship, Reports on Ocean Soundings, Voyage to the Polar Sea, &c.

Narghile, or NARGILEH (nàr'gē-lā), a kind of Eastern tobacco-pipe, the chief feature of which is that when used the smoke is made to pass through water.

Naro, a town of Sicily, prov. Girgenti. Pop. 10,395.

Narragansett Bay, a bay of the U. States, running into Rhode Island for 28 miles.

Narses, the companion-in-arms of Belisarius, and one of the most successful generals of the emperor Justinian, was an Asiatic slave and eunuch whom the latter had taken into favour and appointed to a command in 538 A.D. Between that period and 552 he put an end to the dominion of the Goths in Italy, and in 553 was himself appointed exarch, and fixed his court at Ravenna. He was deposed under the emperor Justinus II. 565, and died at Rome 568.

Narsinghpur, chief town of district of the same name, Central Provinces of India. It is an important centre for the grain and cotton trade of the Nerbudda Valley. Pop. 10,222. The district has an area of 1916 square miles, and pop. 365,173.

Narthex. See *Asafetida.*

Narva, a town of Russia, in the government of St. Petersburg and 79 miles southwest of that city, on the Narova. Narva is celebrated for the great victory gained by Charles XII. in its vicinity over the Russians in 1700. The latter retook the place by storm in 1704. Pop. 8610.

Narvaez (nàr-vä'eth), RAMON MARIA, Duke of Valencia, Spanish statesman and general, born 1800, died 1868. Early in life he entered the Spanish army, and he rapidly acquired distinction. When Gomez, the Carlist general, was engaged in his adventurous march through Spain in 1836, Narvaez, who then commanded a division under Espartero, was directed to pursue him, and totally routed him near Arcos. He then devoted himself to politics, and became the rival of Espartero himself. Having taken part in an unsuccessful rising of the progressista party in 1838, he fled to France and remained there five years. In 1843 he hastened to Spain, put himself at the head of an insurrection, and entered Madrid victorious (July, 1843). In the following year he formed his first ministry, and received from Queen Isabella the rank of marshal and the title of Duke of Valencia. His government was overthrown in 1846, but he was soon recalled, and during the remainder of his life was several times intrusted with the formation of a cabinet.

Narwhal (*Monŏdon monocĕros*), a cetaceous mammal found in the northern seas, averaging from 12 to 20 feet in length. The body colour is whitish or gray spotted

Narwhal or Sea-unicorn (*Monŏdon monocĕros*).

with darker patches. There is no dorsal fin. The dentition of the narwhals differs from that of all other members of the dolphin family. In the female both jaws are toothless, but the male narwhal has two canines in the upper jaw, which are sometimes developed into enormous projecting tusks, though commonly only the one on the left side is so developed, being straight, spiral, tapering to a point, and in length from 6 to 10 feet. It makes excellent ivory. From the frequency with which the narwhal appears as having a single horn it has obtained the name of the *Sea-unicorn*, *Unicorn-fish*, or *Unicorn Whale*. The food of the narwhal appears to consist chiefly of mollusca, and notwithstanding its formidable armature it is said to be inoffensive and peaceable. The Greenlanders obtain oil from its blubber, and manufacture its skin into useful articles.

Naseberry, the fruit of *Sapōta Achras*, one of the finest W. India fruits. See *Sapota.*

Naseby, a village in Northamptonshire, England, 12 miles from Northampton. In 1645 Fairfax and Cromwell entirely defeated Charles I. in the vicinity.

Nash, JOHN, an English architect, born in London in 1752, died 1835. In 1815 he was made surveyor to the crown estates. He laid out Regent's Park, formed Regent Street, and built the United Service Club, Haymarket Theatre, and Buckingham Palace, London, as also the Pavilion at Brighton.

Nash, RICHARD, known as *Beau Nash*, born at Swansea 1674, died 1761. He was master of the ceremonies at Bath, and for many years was sole arbiter of fashion. He died in comparative indigence.

Nash, THOMAS, an English satirist and dramatist, born at Lowestoft, Suffolk, in 1558, died 1600 or 1601. He graduated at Cambridge in 1584, but was afterwards expelled for satirizing the authorities. After spending several years on the Continent he returned to London in 1589, and took an active part in the Martin Marprelate controversy, writing several pamphlets on the prelatical side. In conjunction with Marlowe he wrote a drama, Dido, Queen of Carthage, and in 1592 produced a comedy of his own, Summer's Last Will and Testament, which was acted before Queen Elizabeth.

Nash'ua, a manufacturing town of the United States, New Hampshire, county of Hillsborough, 35 miles south of Concord, at the junction of Merrimac and Nashua rivers. It has several extensive cotton manufactories, and manufactures of steam-engines, locks, guns, tools, shuttles, carpets, &c. Pop. 1890, **19,311.**

Nashville, United States, capital of the State of Tennessee, seat of Davidson county, on the left bank of the Cumberland, on rocky bluffs rising above the river. The state Capitol on Capitol Hill is a fine building. The town has no fewer than four universities: Nashville University, with a specially important medical school; Vanderbilt University; Fisk University for coloured students; and Roger Williams (Baptist) University. Nashville is a great commercial centre, having a large trade in cotton and tobacco. There are cotton factories and other works. Pop. 1890, 76,168.

Nasik, a district in Bombay, British India; area, 5940 square miles. Pop. 781,206. The chief town is Nasik, which ranks among the most sacred places of Hindu pilgrimage, and is a place of considerable industrial importance. Pop. 27,070.

Nasirabad', an Indian cantonment in Rajputana, 15 miles S.E. from Ajmere. It is garrisoned by troops of the Bombay army. Pop. 21,320. Also the name of town in the Nasirabad sub-division of Khandesh District, Bombay Presidency. Pop. 10,243.

Nasmyth (nā'smith), ALEXANDER, a landscape-painter, born at Edinburgh in 1758, died in 1840. He went early to London, and studied under Allan Ramsay, painter to George III. He afterwards proceeded to Rome, and on his return to Edinburgh he commenced portrait-painting, but soon abandoned it for landscape. His style is remarkable for its simplicity and beauty. —PATRICK, or PETER, son of the former, born at Edinburgh in 1786, died 1831, was also a painter. Owing to an injury to his right hand he learned to paint with his left. In London, where he became very popular as a painter of English landscape, he was designated the English Hobbema. — JAMES, another son, born in Edinburgh 1808, was educated at the School of Arts, Edinburgh, and in engineering under Maudsley in London. He removed in 1834 to Manchester, where he became a successful machine constructor and inventor. The steam-hammer, which has rendered possible the immense forgings now employed, was invented by him in 1839. The steam pile-driver, and the safety foundry ladle, are among his other inventions. He has also acquired fame as a practical astronomer.

Nasr-ed-Deen, Shah of Persia, born 1829, succeeded 1848. In 1856 his occupation of Herat involved him in war with Britain. Since then he has been friendly, and has made two journeys to Western Europe, in 1873 and 1889. In his reign telegraphic communication between Europe and India through Persia was secured.

Nassau, formerly a state of Germany, now part of the Prussian province of Hesse-Nassau, seized by Prussia in 1866.

Nassau, capital of the Bahamas, island of New Providence, a handsome city, and a winter health resort for Americans and West Indians. Pop. about 5000.

Nast, THOMAS, caricaturist, was born in Bavaria in 1840; was brought to the United States in 1846. After service in England and Italy he began drawing war sketches for *Harper's Weekly* in 1862. In his particular line, pictorial satire, Nast stands in the foremost rank.

Nastur'tium, or Indian cress, an American climbing annual with pungent fruits and showy orange flowers.

Natal', a British colony on the south-east coast of Africa, bounded on the N. by Zulu-

land; S. by Pondoland and E. Griqualand; W. by Basutoland, the Orange Free State, and S. African Republic; and E. by the Indian Ocean, with a sea-board of 180 miles. Its area is 21,150 square miles. The only spot where sheltered anchorage can be obtained is at Port Natal, a fine circular bay near the centre of the coast. (See *Durban.*) The surface is finely diversified, rising by successive terraces from the shore towards the lofty mountains on its western frontiers. The chief summits are Champagne Castle, 10,357 feet; Mont aux Sources, about 10,000 feet; and Giant's Castle, 9657. The mineral productions are principally coal, ironstone, limestone, and marble. Gold has also been found in various localities. The colony is well watered, but none of its rivers are navigable. The most important rivers are the Tugela, Umvoti, Umgeni, Umkomanzi, and Umzimkulu. The climate on the whole is extremely salubrious, and by no means trying to European constitutions. There are large forests on the western and northern frontiers. The soil is generally rich and strong. On the higher forest and table land cattle thrive well; and in the interior wheat, barley, oats, maize, beans, and vegetables of almost every description have been largely and successfully grown. In many parts the vine and fruit-trees thrive well, and in the coast region generally cotton, tobacco, indigo, sugar-cane, and coffee grow well. In the less-frequented parts of the interior elephants and lions are still occasionally seen; the leopard is not uncommon, and hyenas, tiger-cats, antelopes, jackals, ant-bears, and porcupines are numerous. The hippopotamus has still his haunts in several of the rivers, and there are numbers of small crocodiles. The birds comprise the vulture, several varieties of eagle, the secretary-bird, wild turkey, &c.—Natal was discovered on Christmas-day 1497, by Vasco da Gama, a Portuguese, and named by him 'Terra Natalis.' The first settlers were the Dutch Boers, who left Cape Colony in 1836, and in 1839 removed to Port Natal and proclaimed themselves an independent republic. The establishment of a hostile settlement at the only port between Algoa and Delagoa Bays was incompatible with British interests, and in 1845 Natal, after a formidable resistance by the Boers, was proclaimed a British possession. In 1856 it was separated from Cape Colony and made a separate colony. The capital is Pietermaritzburg or Maritzburg. The governor is appointed by the crown, and is assisted in the administration of the colony by an executive and a legislative council. Twenty-three members of the latter are elected by counties and burghs. The revenue in 1891 was £1,366,112; the imports were £3,335,831, the exports £1,371,240. The trade, especially with the interior, has been greatly facilitated by the railways, of which the colony has some 250 miles. Wool and gold are the chief exports. Pop. 543,913, comprised of 46,788 whites, 41,142 Indians, and 455,983 natives (chiefly Kaffirs).

Natato'res, the order of swimming birds characterized by a boat-shaped body, usually by a long neck, short legs placed behind the centre of gravity so as to act as paddles, toes webbed or united by a membrane to a greater or less extent, close oily plumage to protect them from sudden reductions of temperature from the water, in which they mostly live and obtain their food. The young are able to swim and procure food for themselves the moment they are liberated from the shell. The Natatores include the ducks, geese, swans, flamingoes, the penguins, auks, divers, grebes, gulls, pelicans, cormorants, gannets, frigate-birds, darters, and others.

Natchez, a city of the United States, in the state of Mississippi and on the river Mississippi, 279 miles above New Orleans. It is built on a bluff 150 feet above the water, and on the narrow strip of land between the foot of the hill and the river. Natchez is a great cotton mart, and has an increasing trade. Pop. 1890, 10,101.

Nat'ica, a genus of gasteropodous molluscs, type of the family Naticidæ.

Natick, Middlesex co., Mass., manuf. boots and shoes. Pop. 1890, 9118.

Nation (Latin, *natio*, from *natus*, born), either a people inhabiting a certain extent of territory and united by common political institutions, such as the English nation; or an aggregation of persons of the same ethnological family and speaking the same or a cognate language. In some universities, as in those of Glasgow and Aberdeen, for instance, the students are divided into 'nations' to distinguish those from different districts or countries. This custom originated in the University of Paris antecedent to the institution of faculties.

National Airs, any class of airs peculiarly identified with the music of some particular people, and especially a tune which

by national selection or consent is adapted to words which represent or reflect a sentiment, taste, or habit of a nation, and which is usually sung or played on certain public occasions. Examples are: God Save the Queen, in Britain; Hail, Columbia, in America; The Emperor's Hymn, in Austria; &c.

National Cemeteries. In the second year of the civil war (1862) the president of the U. States was authorized by congress to purchase national cemetery grounds for soldiers who had died in the defence of the nation. There are 83 of these cemeteries, containing the bodies of 330,700 men—soldiers and sailors. Each grave is marked by a stone tablet. Liberal appropriations are made by congress from year to year for the proper maintenance of the cemeteries.

National Debt, the sum which is owing by a government to individuals who have advanced money to the government for public purposes, either in the anticipation of the produce of particular branches of the revenue, or on credit of the general power which the government possesses of levying the sums necessary to pay interest for the money borrowed or to repay the principal. See *Funds.*

National Gallery, THE, the British national picture-gallery. This collection of paintings, situated in Trafalgar Square, London, originated in a collection formed by Mr. Angerstein, consisting of 38 pictures, 29 by old masters and 9 by British painters, and purchased with public funds in 1824 for £57,000 as the nucleus of a national gallery. Since that time the collection has been greatly enlarged by purchases out of moneys provided by parliament, as well as by bequests and gifts. Of the latter the most munificent has been that of Mr. Vernon in 1847, a collection of 157 works of English painters. Another highly valuable section is that of the pictures and drawings by Turner bequeathed to the nation at his death in 1851. In 1871 a valuable prize was secured by the purchase for £75,000 of Sir R. Peel's collection, consisting of 77 paintings and 18 drawings. In 1885 parliament voted £70,000 for the purchase of a single picture, the Ansidei Raffaelle, together with £17,500 for another, Vandyck's Charles I. on Horseback. The National Gallery now comprises fully 1200 pictures, and though specially strong in examples of the British school of painting, foreign masters are fully represented. In 1887, by the completion of the new rooms, which had been in progress since 1885, the interior of the building was at length made worthy of its contents, and the increased space obtained now for the first time permits an orderly arrangement of the national collection, a collection which, while not the largest, is one of the finest in all Europe.—The NATIONAL PORTRAIT GALLERY is a distinct institution from the above, contains about 800 portraits, but has as yet no permanent accommodation for the collection. The Scottish National Gallery and National Portrait Gallery are domiciled in Edinburgh.

National Guards, in France, an armed organization of the inhabitants of towns or districts for local defence, differing mainly from the militia and volunteers of Britain in that it was at the disposal of the respective municipalities rather than of the crown. After the suppression of the communal revolt in Paris (1871) the National Assembly decreed the dissolution of the National Guard.

Nationalists, the term applied to the Irish political party whose programme includes the more or less complete separation of Ireland from Great Britain. See *Home Rule.*

National League. See *Land League.*

National Park. See *Yellowstone, Yosemite, North-west Territories.*

Nations, LAW OF. See *International Law.*

Nativity. See *Astrology.*

Natolia, or ANATOLIA. See *Asia Minor.*

Natron ($Na_2CO_3\,10\,H_2O$), native carbonate of soda or mineral alkali, found in the ashes of several marine plants, in lakes in Egypt, and in some mineral springs.

Natron Lakes, several lakes or pools rich in natron in the vicinity of Zakook, a village about 60 miles W.N.W. of Cairo.

Natterjack, NATTERJACK TOAD, the *Bufo calamita,* a species of toad found in various parts of Western Europe, in certain parts of Asia (including Tibet), and not uncommon in England. The general colour is lightish-brown, spotted with patches of a darker hue. A line or streak of yellowish tint passes down the middle line of the back. It does not leap or crawl like the common toad, but rather runs, whence it has the name of walking or running toad. It has a deep and hollow voice, audible at a great distance. It is often found in dry situations.

Nattor', a town of India, in Bengal, on the Nadar river, an offshoot of the Ganges. Pop. 9094.

Natural Bridge, in Rockbridge county, Va., spans a deep chasm, through which a small stream flows, and is formed by an immense limestone stratum fashioned into an arch 215 ft. high, length 93 ft., width 80.

Natural Gas, a gas found issuing naturally from crevices in the earth's surface in various localities. It burns like ordinary coal gas, and consists of a mixture of various hydro-carbons, the chief ingredient being marsh-gas (fire-damp). It has long been known and utilized to some extent as an illuminant, but only in recent years has it attained much importance, being now largely employed in the U. States both for lighting purposes and as a fuel. It is most abundant in the petroleum regions.

Natural History, in its widest sense, that department of knowledge which comprehends the sciences of zoology and botany, chemistry, natural philosophy or physics, geology, palæontology, and mineralogy. It is now, however, commonly used to denote collectively the sciences of botany and zoology, and it is sometimes restricted to denote the science of zoology alone.

Naturalism, the doctrine that all the operations in the universe, moral as well as physical, are carried on in accordance with fixed laws, and without the interference of any supernatural power.

Naturalization. See *Alien.*

Natural Philosophy, originally the study of nature in general; but now commonly restricted to the various sciences classed under *Physics.*

Natural Selection, a phrase frequently employed in connection with Darwin's theory of the origin of species, to indicate the process in nature by which plants and animals best fitted for the conditions in which they are placed survive, propagate, and spread, while the less fitted die out and disappear; this process being combined with the preservation by their descendants of useful variations arising in animals or plants. Mr. Darwin's theory takes origin from the fact that all species *vary* to a greater or less extent. These variations, through particular or 'selected' members of the species, become perpetuated. What was at first a mere individual variation becomes in this way and through transmission a perpetuated 'variety' or a 'race.' These 'races' are subject to a similar process of variation, and varieties of the race may in turn appear; and thus through the variety we in time arrive at forms which present characters so widely different from those of the original species that they may be regarded structurally and functionally as new species. In the domestication and breeding of cattle and sheep, in the numerous varieties of dogs, pigeons, and other animals, man, it is believed, through artificial selection, has imitated nature in her process, and has produced varieties or breeds which differ widely from the original stock or specific type.

Natural Theology is that department of ethics which deals with those propositions relating to the existence and attributes of God and the duty of man which can be demonstrated by human reason, independent of written revelation.

Nature, a weekly scientific journal published in London, and contributed to by the leading scientists of the day. It was begun in Nov. 1869. It is edited by Mr. Joseph Norman Lockyer the astronomer. (See article *Lockyer.*)

Nature Printing is the art of giving an exact reproduction of natural objects by printing from impressions of the objects themselves formed by pressure on metallic plates. The only objects to which the art can be applied with success are those with tolerably flat surfaces, such as dried and pressed plants, especially ferns and seaweeds, embroidery and lace, the grain of wood, &c.

Naugatuck, New Haven co., Conn., on river of same name, 27 m. N. by E. from Bridgeport by Naugatuck Railroad. It has a high school, savings bank and various factories. Pop. 1890, 6218.

Nau'kratis, an ancient Greek city in Egypt, which stood on a navigable canal in the western part of the Delta near the Canopic branch of the Nile. It existed as early as the beginning of the 7th century B.C., and had been a place of great splendour. Recent excavations on the site of the city have been productive of highly valuable results.

Naumachia (na-mā'ki-a; from the Greek *naus*, a ship, and *machē*, a fight), among the Romans a public spectacle representing a mock sea-fight. The same term also signified the edifices in which these combats took place.

Naumburg (noum'burh), a town of Prussian Saxony, 18 miles S.S.W. of Merseburg, in the valley of the Saale. One of the principal buildings is the cathedral, partly Gothic and partly Romanesque, completed in 1249. The manufactures consist of

combs, playing-cards, leather, hosiery, &c. Pop. 19,107.

Naupactus. See *Lepanto.*

Nauplia. See *Napoli di Romania.*

Nau'plius, a term applied to the earliest stage in the development of the lower Crustacea. The naupliiform larva has an ovate unsegmented body, a median eye, and three pairs of limbs. This form is regarded as the primitive form of all crustaceans.

Nau'sea, the sensation of sickness, or inclination to vomit, similar to that produced by the motion of a ship at sea. Though the feeling is referred to the stomach, it frequently originates in disorder of other and remote parts of the body, such as the brain, kidneys, womb, &c.

Nautical Almanac. See *Almanac, Nautical.*

Nau'tilus, a genus of cephalopods with polythalamous or many-chambered shells. The shell of the pearly nautilus (*N. pompilius*) is a spiral with smooth sides. The turns or whorls are contiguous, the outer whorl covering the inner. The chambers of the shell are separated by transverse septa, and one after the other have been the residence of the animal, being successively abandoned as it has grown. The animal thus always resides in the cavity of its outermost or external chamber. A siphuncle connects the body with the air-chambers, passing through each transverse septum till it terminates in the smallest chamber at the inner extremity of the shell. These internal chambers contain only air. By means of the siphuncle the animal is enabled to sink itself or to swim. The nautilus is an inhabitant of the tropical seas. Only three or four existing species are known, though the fossil species exceed a hundred. The name is often loosely applied to the shells of different genera of mollusca. The animal which has been said to sail in its shell upon the surface of the water is the paper-nautilus or argonaut. See *Argonaut.*

Nautilus shown in section.

Nautilus Propeller, a hydraulic device for propelling ships. Water is admitted into a water-tight compartment in the bottom of the vessel, in which is a horizontal turbine-wheel rotated by a vertical shaft from the engine. The rotation of the wheel impels the water through two pipes outwardly to each side of the ship, where it escapes through two nozzles that may be directed either toward the bow or stern of the vessel, causing her either to go ahead or back, as the case may be.

Nauvoo, a town of the United States of America, Hancock county, Illinois, founded in 1840 by the Mormons, and afterwards occupied for a time by a company of French socialists. The culture of grapes is the chief industry. Pop. 1400.

Navajo Indians (nä-vä'hō), a tribe of American Indians numbering (1890) 17,204, many of whom are engaged in civilized pursuits. They occupy a reservation in the N.W. of New Mexico and the N.E. of Arizona.

Naval Artillery Volunteers (ROYAL), a body of volunteer auxiliaries, in number about 2000, raised in 1873, and consisting of four brigades, the Thames, Severn, Mersey, and Clyde. A capitation grant of 30*s.* a head was granted in 1886.

Naval Cadets are boys in training for service as officers in the line and engineer corps of the navy and of the marine corps. One is allowed for each member or delegate of the United States House of Representatives, one for District of Columbia, and ten at-large appointed by the President. They must not be under fifteen nor over twenty years of age, physically sound and of robust condition. See *Naval Schools.*

Naval Hospitals. See *Hospital.*

Naval Reserve (ROYAL), a British force originating in 1859, and recruited from the merchant service, fishing centres, &c., the members being classed able seamen, ordinary seamen, and boys. They number about 20,000. The enrolment is for five years, and four enrolments qualify for a pension. There is a yearly drill of twenty-eight days, and volunteers are bound to serve three years at sea if required, and the term may be prolonged for two years more by proclamation on emergency. When on service on shore volunteers receive a money allowance as fixed by the admiralty, the same pay as in the navy, and an allowance for travelling expenses. There are other bodies also forming a naval reserve, namely the coast-guard, the naval artillery volunteers, and the seamen pensioners.

Naval Schools. The chief naval school in Britain is the Royal Naval College, Greenwich, an institution fully equipped for the teaching of all branches of theoretical and practical knowledge connected with

the profession of a naval officer, including mathematics, physics, mechanics, chemistry, fortification, navigation, surveying, marine engineering, drawing, &c. The college is for officers above the rank of midshipmen. The United States Naval Academy, at Annapolis, Md., was founded in 1845; and the students, during a six years' course, receive the pay of naval cadets—$500 per annum. The number is usually about 300. See *Naval Cadets*, *Midshipman*, *Navy*.

Nav'an, a town of Ireland, county of Meath, at the junction of the Boyne and Blackwater, 36 miles north-west of Dublin. It has a woollen factory and several flour-mills. Pop. 3873.

Navari'no, a seaport of Greece, on the south-west coast of the Morea, near the site of the ancient Pylos, the scene of the defeat of the Turco-Egyptian fleet under Ibrahim Pasha by the allied fleets of Britain, France, and Russia, under Sir E. Codrington, 20th Oct. 1827.

Navarre (Spanish, *Navarra*), a former kingdom, now a province of Spain, between Aragon, Old Castile, and Biscay; area, 4045 square miles; pop. 321,015. Its northern boundary is very mountainous, being composed of the western slopes of the Pyrenees, which by their numerous streams supply the Ebro and Bidassoa, its principal rivers. Extensive forests clothe the mountain slopes, but the lowlands produce wheat, maize, wines, oil, flax, hemp, and all sorts of leguminous plants, as well as abundant pastures for cattle of every description. Iron, copper, lead, &c., are among the minerals. The capital is Pamplona. The ancient Kingdom of Navarre comprised both the modern Spanish province, sometimes called Upper Navarre, and also French or Lower Navarre, separated from the former by the Pyrenees, and now comprised in the departments of Basses Pyrénées and Landes. Ferdinand the Catholic annexed Upper Navarre to Castile in 1512, while the north portion ultimately passed, with Henry IV., to the crown of France.

Nave, in Gothic architecture, that part of a church extending from the western entrance to the transept, or to the choir and chancel, according to the nature and extent of the church.

Navel, or UMBILI'CUS, the aperture or passage in the abdomen which in the adult is normally closed, but in the fœtus or embryo gives passage to the umbilical vessels, by means of which the fœtus communicates with the parent through the placenta. The cicatrization or healing of the navel produces the contracted and depressed appearance so familiar in the external aspect of the structure.

Navigation, the science or art of conducting ships or vessels from one place to another. The management of the sails, rudder, &c., or the working of the ship generally, though essential to the practice of navigation, belongs rather to seamanship, navigation being more especially the art of directing and measuring the course of ships, the method of determining their position, &c., by the laws of geometry, or by astronomical principles and observations. In order to the accomplishment of this the ship must be provided with accurate charts of seas, plans of ports and harbours, &c., compasses, chronometer, sextant, log and log-line, various mathematical instruments, leads and lead-lines, log-book, &c. It is by the compass that the direction in which the ship sails or should sail is determined. Though it points in a northerly direction, it does not generally point to the true north, but has a certain variation which must be taken into account. The rate of speed at which a vessel is sailing is found by means of the log, which is heaved usually at the end of every hour. By noting the rate of sailing, the direction of the course, and the time occupied, the ship's position may be estimated, allowance being made for deviation caused by currents, and by the wind driving the vessel to leeward. The position thus determined is said to be found by dead-reckoning. It is not safe to trust to dead-reckoning for any length of time, and a more accurate method of finding the vessel's position at any time is required. This consists in taking observations of the heavenly bodies with the sextant, and these being compared with data given in the Nautical Almanac, while correct Greenwich time is given by the chronometer, the latitude and longitude, or true position, is easily found. In navigating a ship a certain knowledge of trigonometry is required; but the operations can be much shortened by tables and instruments. In directing a ship's course, and applying it on a chart, several methods of what are called *sailings* are employed, as plane sailing (the earth being regarded as having a plane surface), Mercator's sailing, great circle sailing (sailing on a great circle of the sphere), &c.

Navigation, Laws Regarding. After the establishment of the independence of the United States, it was natural that a spirit of retaliation should prevail in the framing of the navigation laws. Laws passed in 1790 and 1792 discriminated to such an extent in favor of American shipping as to give a monopoly of the foreign carrying trade. In 1815 a treaty was negotiated between the United States and Great Britain by which the ships of the two countries were placed reciprocally upon the same footing in the ports of the United States and Great Britain. The shipping act of 1884 places the sailing fleet of the United States on an equality with the vessels of other flags as regards the expenses of navigation. Consular fees are abolished, and consuls are paid by the government. The further payment of advance wages to seamen was prohibited. The "limited liability act" provides that the individual liability of a ship-owner, for the ship's debts, except for wages due to persons employed by the owners, shall be limited to the proportion of his interest.

Navy, a collective term for all the ships, or all of a certain class, belonging to a country. Thus we may speak of the mercantile navy of Britain; but the term by itself means the whole of the ships of war belonging to a nation; or the whole naval establishment of any country, including ships, officers, men, stores, &c. The organization of a national naval force in England is assigned to Alfred the Great; but it was not till the time of Henry VIII. that a regular shape was given to the Royal Navy as a standing force. In his reign an admiralty office was established and public dockyards opened at Woolwich, Deptford, and Portsmouth. In the reign of Elizabeth the naval power of England was increased by charters and money grants given to merchant adventurers, trading companies, and privateers. Classing ships by rates or ranks based on their relative fighting power appears to have become well established during the Commonwealth, when the navy attained great importance; and a similar classification prevailed up to the middle of the present century. When George I. came to the throne the navy consisted of 178 ships, ranging from about 374 tons burden to one of 1869 tons, carrying 100 guns. Two leading qualities now stood forth as the most important object to be attained in the construction and equipment of vessels for war—strength of offensive armament, and speed and facility of manœuvring. These qualities gained in relative importance at the expense of a previously preponderating element of equipment, namely, the number of fighting men available for assault at close quarters. Two classes of vessels, according to the preponderance of one or other of these qualities, thus came to constitute the chief strength of modern fleets. The ship of the line, or first-class war vessel, carried the strength of offensive equipment to the utmost limit practicable without sacrificing sea-going qualities. The frigate, only excelled in strength by a line-of-battle ship, was built and rigged with every artistic appliance to secure speed. The great point in a first-class vessel was the weight of broadside, and a hundred or more guns on three decks were commonly carried. In a pitched battle it was the line-of-battle ships that bore the brunt of the fight and decided the day. The frigates scoured the seas on special missions, escaped from the enemy's line-of-battle ships by speed, destroyed his privateers, and protected the commerce of their own state. During all the great European wars these were the leading types of vessels employed. In the early part of the present century Britain had usually over 100 ships of the line and about 150 frigates in commission, besides an equal number of sloops and other vessels, measuring 800,000 to 900,000 tons in all. Between 1841 and 1859 steam were gradually substituted for sailing vessels in the British navy; and since 1860 armour-plated ships, armed with guns of enormous calibre, have been substituted for timber vessels. See *Iron-clad Vessels.*

The government of the navy is vested in a board, known as the Board of Admiralty, the members of which are styled 'lords commissioners for executing the office of lord high admiral.' The board consists of five members: the *first lord*, who has supreme authority; the *senior naval lord*, who directs the movements of the fleets, and is responsible for their discipline; the *third lord* has the management of the dockyards, and superintends the building of the ships; the *junior naval lord* deals with the victualling of the fleets and with the transport department; and the *civil lord* is answerable for the accounts. Under the board is a financial secretary, changing, like the five lords, with the government in power; while the fixed administration consists of two permanent

secretaries and a number of heads of departments. The highest rank in the active service is that of Rear-Admiral.

The American Navy during the war with Spain. N. Atlantic Station: R.-Admiral, W. T. Sampson; Commodores, J. A. Howell, W. S. Schley, J. C. Watson, G. C. Remey. Ships Algonquin, Amphitrite, Annapolis, Armeria, Bancroft, Blake, Badger, Brooklyn, Cæsar, Calumet, Cassius, Celtic, Cincinnati, Castine, Columbia, Cushing, Detroit, Dolphin, Dorothea, Dupont, Eagle, Ericsson, Fern, Fish Hawk, Foote, Gloucester, Gwin, Hamilton, Hannibal, Harvard, Hawk, Hector, Helena, Hist, Hornet, Hudson, Indiana, Iris, Justin, Lancaster, Lebanon, Leonidas, Leyden, Machias, Mangrove, Manning, Maple, Marblehead, Marietta, Massachusetts, Mayflower, McKee, McLane, Merrimac, Miantonomoh, Montgomery, Morrill, Nashville, New Orleans, Newport, New York (flagship), Nerinscot, Niagara, Oneida, Osceola, Panther, Peoria, Pompey, Porter, Prairie, Puritan, Resolute, Rodgers, Samoset, San Francisco, Saturn, Scipio, Scorpion, Sioux, Solace, Sterling, Southeroy, St. Louis, St. Paul, Supply, Suwanee, Talbot, Tecumseh, Terror, Texas, Uncas, Vesuvius, Vicksburg, Vixen, Wasp, Wilmington, Windom, Winslow, Wompatrick, Woodbury, Yale, Yankton. Eastern Squadron, Com. J. C. Watson commanding: Aberenda, Alexander, Dixie, Iowa, Newark (flagship), Oregon, Scindia, Yankee, Yosemite. Coast-Defense Fleet: Aileen, Apache, Canonicus, Catskill, Choctaw, Free-Lance, Governor Russell, Jason, Lehigh, Mahopac, Manhattan, Montauk, Nahant, Nantucket, Passaic, Potomac, Powhattan, Restless, Viking, Wyandotte. Pacific Station, Rear-Ad. J. N. Miller commanding: Active, Albatross, Alert, Bennington, Corwin, Grant, Iroquois, Mohican, Perry, Philadelphia, Rush, Vigilant, Wheeling. Asiatic Station, Rear-Ad. George Dewey, Commander-in-Chief: Baltimore, Boston, Brutus, Charleston, City of Pekin, Concord, McCulloch, Monadnock, Monocacy, Monterey, Nanshan, Nero, Olympia (flagship), Petrel, Raleigh, Zafiro. Special Service: Katahdin, Michigan, Minneapolis, Vulcan. And 27 others, being those unassigned, receiving, and schoolships.

The principal war navies rank as follows: Great Britain, France, the United States, Germany, Italy, Japan, and Russia. The following synopsis gives the number of vessels in each class belonging to each nation; the Roman figures being those already built and the italics new vessels on the stocks or appropriations made therefor. [From a British Govt. return, March 31, 1898].

Great Britain: Battleships, 52, *20;* cruisers, armored, 18, *12;* protected, 95, *27;* unprotected, 16; coast-defense, 15; special vessels, 3; torpedo-vessels, 35; torpedo-boat destroyers, 50, *46;* torpedo-boats, 98, *12.* France: Battleships, 27, *8;* cruisers, armored, 9, *10;* protected, 30, *10;* unprotected, 16; coast-defense, 14; special, 1; torpedo-vessels, 13, *2;* torpedo-boat destroyers, *8;* torpedo-boats, 211, *38.* United States: Battleships, 5, *8;* cruisers, armored, 2; protected, 14, *1;* unprotected, 10; coast-defense, 20; special, 1; torpedo-boats, 8, *22;* torpedo-boat destroyers, 20. Germany: Battleships, 17, *5;* cruisers, armored, 3, *2;* protected, 7, *8;* unprotected, 21; coast-defense, 11; special, 1; torpedo-vessels, 2; torpedo-boats, 113, *9;* torpedo-boat destroyers, *1.* Italy: Battleships, 15, *2;* cruisers, armored, 3, *2;* protected, 15, *3;* unprotected, 1; special, 2; torpedo-vessels, 15; torpedo-boats, 142, *2;* torpedo-boat destroyers, *1.* Russia: Battleships, 12, *6;* cruisers, armored, 10, *1;* protected, 3, *3;* unprotected, 3; coast-defense, 15, *1;* special, 5; torpedo-vessels, 17; torpedo-boat destroyers, 1, *28;* torpedo-boats, 174. Japan: Battleships, 3, *3;* cruisers, armored, 1, *6;* protected, 10, *6;* unprotected, 8, *1;* coast-defense, 3; torpedo-vessels, 1; torpedo-boats, 44, *12;* torpedo-boat destroyers, *8.*

It will be noted that this list excludes many of the war-ships engaged in the Spanish war; a number of these were purchased or commissioned on or immediately before the outbreak of hostilities. The number of ships contemplated being built was further augmented in Aug. 1898, as follows: U. S. battleships, 3 of 13,000 tons; armored cruisers, 3 of 12,000 T.; protected cruisers, 3 of 6000 T.; and 6 of 2500 T. The appropriation is for $120,000,000.

Navy Yards. See *Dock-yards.*

Naxos, or NAXIA, an island of the Grecian Archipelago, the largest of the Cyclades, length 18 miles; breadth, 12 miles; area, 170 square miles. It is hilly, but extremely productive. The chief products are fruit, wine, oil, cotton, silk, cheese, honey, and wax. The chief town is Naxia (or Naxos). Pop. of the island, 12,500.

Nazarenes, a designation given to the early Christians from the town of Nazareth,

where Christ dwelt. The name was also applied to a sect which arose at the end of the 1st century, and existed chiefly in Egypt. They are supposed to have retained a judaizing adherence to the Mosaic law, and to have held a low opinion about the divinity of Christ.

Naz'areth, a small town in Palestine, 65 miles north of Jerusalem, celebrated as the residence of our Saviour during his youth. It is surrounded on all sides by hills. The houses are of stone, well built, with flat roofs. The principal edifices are the conventual buildings of the Franciscan monks, including the Latin Church of the Annunciation. Pop. about 3000.

Naz'arites, or NAZIRITES, among the ancient Jews, persons who devoted themselves to the peculiar service of Jehovah for a certain time or for life. The law of the Nazarites (from the Hebrew *nazar*, to separate) is contained in Numbers vi. 1–21.

Neagh, LOUGH (lo*h* nā or nā'*à*h), a lake of Ireland, the largest in the British Isles, being 19 miles long by 12 miles broad, and covering an area of 153 square miles. It washes the counties of Antrim, Armagh, Tyrone, and Londonderry. The shores are low and sandy, and it contains a few very small islands. Its greatest depth is 102 feet, and it is 48 feet above the sea-level. Its chief feeders are the Upper Bann, Blackwater, Maine, Six Mile, and Ballinderry, and its outlet is at its north extremity through Lough Beg into the Lower Bann. Its waters are well known for their petrifying properties.

Neal, DANIEL, an English dissenting clergyman, born 1678, died 1743, long pastor of a church in London. He wrote a History of New England and other works, but is best known by his History of the Puritans (1732–38).

Neale, JOHN MASON, clergyman of the English Church, born 1818, died 1866. He belonged to the High Church party, and was a voluminous writer, among his works being History of the Holy Eastern Church; History of the so-called Jansenist Church of Holland; Essays on Liturgiology and Church History; Mediæval Hymns from the Latin; Hymns of the Eastern Church. He wrote a number of popular hymns.

Nean'der, JOHANN AUGUST WILHELM, Protestant theologian, born of Jewish parents at Göttingen in 1789; died at Berlin 1850. He was early converted to Christianity, and was appointed extraordinary professor of theology at Heidelberg in 1812. In the same year, however, he accepted an invitation to the University of Berlin, where he spent the remainder of his life in uninterrupted labours for the good of the church and general learning. His chief works are his Life of Christ, in refutation of Strauss; his General History of the Church; and his History of the Apostolic Church.

Neap-tides, tides which happen in the middle of the second and fourth quarters of the moon. They are the lowest tides. See *Tide*.

Neath, a town and river port on the Neath, in South Wales, in the county of Glamorgan, 7 miles E.N.E. of Swansea. It carries on a considerable trade, and the industries include copper-smelting, tinplate-working, and the manufacture of chemicals. Near the town are the remains of Neath Castle and Abbey, both erected in the 12th century. It is one of the Swansea district of parliamentary boroughs. Pop. 10,447.

Nebo.

Nebo, or NABU, an ancient Assyrian and Babylonian deity, lord of the planet Mercury, and ruler of the hosts of heaven and earth, according to Babylonian inscriptions, especially honoured in Borsippa. Statues of Nebo have been found in Nineveh, showing him with long beard and hair, and clad in a long robe.

Nebras'ka, one of the United States, bounded by S. Dakota, Iowa, Missouri, Kansas, Colorado, and Wyoming; area, 77,510 square miles. The greater part of the state consists of gently undulating land with a slight inclination to the eastward. On the N.W. is a desolate tract known as the Mauvaises Terres or Bad Lands, rich in interesting fossil remains. Timber has been extensively planted of late. The principal rivers are the Missouri, which forms the boundary on the east; its great affluent, the Nebraska or Platte, which, formed by two main forks, a northern and a southern, both from the Rocky Mountains, traverses the territory in

an eastern direction; and the Republican Fork of Kansas River, traversing the southern part of the state. The climate is, on the whole, fine, the mean temperature in summer being 70° to 74°, in winter from 22° to 30°. The soil, except in the north-west and south-west, is a deep rich loam underlaid by a porous clayey subsoil, and is thus admirably adapted to withstand drought. The principal crops are maize, wheat, oats, barley, potatoes, and hay. Stock-raising is largely carried on, cattle and horses requiring little protection or hand-feeding during winter. Manufactures are as yet generally restricted to the supply of local wants. The railway system centres in Omaha, the chief city, the Union Pacific Railway passing through the state. Limestone, sandstone, and gypsum are abundant; coal is found in limited quantity; and there is a good supply of salt. The chief towns are Omaha (by much the largest) and Lincoln (the state capital). At the head of the educational establishments stand the State University at Lincoln, the Protestant Episcopal College in Nebraska City, and the Congregational College at Crete. In all the principal towns there are graded and high schools supported by general and local taxation, and a generous share of the public lands has been set apart for educational purposes. Nebraska came into the possession of the United States as part of Louisiana in 1808, was recognized as a separate territory in 1854, and was admitted into the Union as a state in 1867. Pop. 1890, 1,058,910.

Nebraska City, a city of the United States, the seat of Otoe county, Nebraska, on the Missouri, about 35 miles S. of Omaha. It contains the Nebraska College (Episcopal), and the trade is active. Pop. 1890, 11,494.

Nebuchadnezzar (in Jeremiah and Ezekiel, *Nebuchadrezzar;* Greek, *Nabuchodonosor*), a king of Babylon, celebrated as the conqueror of Judah. He reigned from 604 to 561 B.C. according to the opinion of modern chronologists, or from 606 to 563 B.C. according to that of older chronologists. He was the son of Nabopolassar, by whom the kingdom of Babylon was definitely made independent of the Assyrian monarchy. In the fourth year of Jehoiakim, king of Judah (605–4 B.C.), he defeated Pharaoh-Necho, king of Egypt, at Carchemish (Circesium), on the Euphrates, after which he subjugated Syria and Palestine, carrying off with him the sacred vessels of the temple and the chief Jews into captivity. He destroyed Tyre in 585, and some years later he invaded and ravaged Egypt. During the peaceful years of his reign he rebuilt in a magnificent manner Babylon and many of the other cities of the empire, and constructed vast temples, aqueducts, and palaces, whose ruins still testify to his grandeur. His insanity and the events preceding are only known to us from the book of Daniel. Several inscriptions relating to his reign have recently been found.

Neb'ula, pl. NEBULÆ, in astronomy, the name given to certain celestial objects resembling white clouds, which in many cases, when observed through telescopes of sufficient power, have been resolved into clusters of distinct stars. As more and more powerful telescopes have been employed, the number of resolvable nebulæ has become greater and greater, and it is probable that many nebulæ irresolvable at present may yet be shown to be star clusters in telescopes more powerful than those now employed. On the other hand, the spectroscope has shown that many nebulæ, among which are several that had hitherto appeared to be well-authenticated clusters, consist, in part at least, of masses of incandescent gas. The recent researches of Mr. Norman Lockyer render it probable that nebulæ include clouds of meteors, which, by their continual impact against one another, produce the heat, light, and gaseous matter that are detected by our telescopes and spectroscopes. A few of the great nebulæ, such as those of Orion, Argo Navis, and Andromeda, are visible to the naked eye; but most are telescopic, and of these upwards of 5000 are now known to astronomers. Nebulæ have been classified as follows:—(1) *Resolvable nebulæ*, and such as apparently only require instruments of increased power to resolve them into separate stars; (2) *Irresolvable nebulæ*, showing no appearance of stars; (3) *Planetary nebulæ*, so called because they slightly resemble in appearance the larger planets; (4) *Stellar nebulæ*, those having in their centre a condensation of light; and (5) *Nebulous stars*, a bright star often seen in the centre of a circular nebula, or two bright stars associated with a double nebula, or with two distinct nebulæ near each other.

Nebular Hypothesis, a theory by means of which Laplace (before the existence of nebulous matter in the universe had been discovered by means of the spectroscope)

accounted for those features of the solar system which must be regarded as accidental in the Newtonian philosophy. This theory supposes that the bodies composing the solar system once existed in the form of a nebula; that this had a revolution on its own axis from west to east; that the temperature gradually diminishing, and the nebula contracting by refrigeration, the rotation increased in rapidity, and zones of nebulosity were successively thrown off in consequence of the centrifugal force overpowering the central attraction. These zones being condensed, and partaking of the primary rotation, constituted the planets, some of which in turn threw off zones which now form their satellites. The main body being condensed towards the centre, formed the sun. The theory was afterwards extended so as to include a cosmogony of the whole universe, and though open to certain objections, is now generally received by astronomers.

Necessity, a word used in philosophical and theological discussions with varying senses, but very commonly implying the operation of a blind fate or destiny, and absence of free-will. See *Will*.

Necho, or Neku, a king of Egypt, mentioned in 2 Kings xxiii. 29 and Jerem. xlvi. 2. He belonged to the twenty-sixth dynasty; succeeded his father Psammeticus I., and reigned from B.C. 610 to 594. He extended his dominions from the S. of Syria to the Euphrates; defeated Josiah king of Judah at Megiddo, but was ultimately driven back by Nebuchadnezzar.

Neck, the part of an animal's body which is between the head and the trunk, and connects them. The bones of the neck in man, and in nearly all other mammals, are the seven cervical vertebræ.

Neckar, a river of Germany which rises in the Black Forest, in Würtemberg, and flows through Baden into the Rhine at Mannheim, after a course, including windings, of about 240 miles. It is navigable half its course for small vessels.

Necker, Jacques, French minister of finance, born at Geneva 1732, died 1804. He became clerk in a Paris banking-house in 1750, and afterwards accumulated a large fortune as a banker. In 1776 he received an appointment to the treasury, the direction of which he retained for five years. Malversation under the preceding reign had caused a large deficit, to which the American war made great additions. Necker endeavoured to meet the exigency by loans and reforms, and above all to fund the French debt and establish annuities under the guarantee of the state. His suppression of abuses had created him many enemies at court, and shortly after the publication of his famous Compte Rendu, in which he furnished a clear statement of the

Necker.

condition in which he had found things, of what he had done and what he intended to do, he resigned and retired to Switzerland, where he published his Administration of the Finances, which had an immense circulation. The errors of Calonne, who next had the management of the state finances, increased Necker's reputation; and in 1788 he was recalled as controller-general. His convictions led him to support the convocation of the states-general and the giving a double representation to the *tiers état*. The states-general were actually summoned to meet on the 1st of May, 1789; but not long after the advisers of the king succeeded in inducing him to give Necker his dismissal, and to order him to leave the kingdom. No sooner was his removal known than all Paris was in a ferment. The storming of the Bastille followed (July 14), and the king found himself compelled to recall the banished minister. His return to Paris resembled a triumphal procession. His first object was to restore tranquillity, and security of person and property. But he was not equal to the political or even the financial crisis, and resigned in September, 1790. He passed the rest of his life in Switzerland, where he occupied himself in writing

political and religious treatises. Necker's daughter was the well-known Madame de Staël.

Nec'romancy, the divination of the future by questioning the dead. This superstition originated in the East, and is of the highest antiquity. We find mention made of necromancy in the Scriptures, where it is strongly condemned. In the Odyssey Homer has made Ulysses raise the shade of Tiresias from the infernal regions. In many parts of Greece there were oracles of the dead, the origin of which is lost in the obscurity of history. Although this practice has been condemned by the Christian Church from the very first, it has not yet entirely ceased. Modern spiritualism embodies all the elements of necromancy. The term is often extended so as to include the general art of magic.

Necroph'orus. See *Burying-beetle.*

Necrop'olis (literally, 'city of the dead'), a name originally applied to a suburb of Alexandria devoted to the reception of the dead, and hence extended to the cemeteries of the ancients generally. The name has also been given to some modern cemeteries in or near towns.

Necro'sis (literally, 'mortification'), a medical term signifying the death of the bone substance. It is a condition of the bone substance corresponding to what gangrene is in the soft parts, thus distinguished from *caries*, which corresponds to ulceration in the soft parts. Necrosis is usually a result of inflammation of the bone, and is often attributed to cold, but frequently it is due to constitutional disease.

Nectan'dra, a genus of forest trees, natives of South and Central America. See *Greenheart.*

Nectar, in Greek myth., the drink of the gods, which was imagined to contribute much towards their eternal existence. It was said to impart a bloom, a beauty, and a vigour which surpassed all conception, and together with ambrosia (their solid food) repaired all the decays or accidental injuries of the divine constitution.

Nec'tarine, a fruit which differs from the peach only in having a smoother rind and firmer pulp, being indeed a mere variety of peach. See *Peach.*

Nec'tary, the name given by Linnæus to every part of a flower that contains or secretes a saccharine fluid, or even to every abnormal part of a flower.

Nectocalyx, in zool., the swimming-bell or disk of a medusa or jelly-fish, by the contractions of which it is propelled through the water.

Nedjed. See *Nejd.*

Needle, a small instrument of steel, pointed at one end, and having an eye or hole in it through which is passed a thread, used for sewing. From very ancient times needles of bone, ivory, wood, and bronze have been used. The manufacture of steel needles was first introduced into England in the reign of Elizabeth. The operations that an ordinary sewing-needle goes through are very numerous, though of late many improvements have been introduced which reduce the number of separate operations, and many of the needle-making processes are performed by machinery at a great saving of time and labour. Worcestershire is the chief seat of the needle manufacture in Britain, and the best foreign needles are made at Aix-la-Chapelle. The chief of the ordinary operations that a sewing-needle goes through in their proper order are such as follow:—The cutting of the steel wire into lengths sufficient for two needles; the pointing of these at both ends on a grindstone by fifty or sixty at a time; the cutting of each length through the middle to give two needles; the flattening of the heads by a blow with a hammer; the piercing of the eyes with a punch applied first on one side then on the other; the trimming of the eyes; the grooving and rounding of the head; hardening, tempering, straightening; polishing, which is done by making up some 500,000 needles into a cigar-shaped bundle along with emery and oil and rolling them backwards and forwards under a weight. Modifications of the ordinary sewing-needle are used in the various forms of sewing-machines, in sailmaking, bookbinding, glove-making, darning, staymaking, &c. The name is also applied to implements of iron or steel, bone, wood, &c., used for interweaving or interlacing a thread or twine in knitting, netting, embroidery, jacquard-loom weaving, &c., and formed in various ways, according to the purpose for which they are intended; as also to sundry long and sharp-pointed surgical instruments, some employed for sewing, others for other purposes, as in couching for cataract. The small piece of steel pointed at both ends and balanced on a pivot, as in the magnetic compass and some forms of telegraphic instruments, is also called a needle, and the term is used for various other objects.

Needle-gun, a breech-loading rifle the cartridge of which contained a small quantity of detonating powder which was exploded by the rapid darting forward of a needle or small spike. It is now superseded by weapons of superior efficiency. See *Rifle*.

Needle-ore, acicular bismuth glance; native sulphide of bismuth, lead, and copper occurring imbedded in quartz in long, thin, steel-gray crystals, marked with vertical striæ, and apparently in four or six sided prisms. It consists of lead 35·8, copper 11, bismuth 36·7, and sulphur 16·5, and usually accompanies native gold.

Needles, The, a cluster of insulated chalk rocks in the English Channel, off the west extremity of the Isle of Wight. They owe their name to their pyramidal and pointed shape. The Needles Lighthouse, on the most westerly of the group, has an occulting light 80 feet above high-water, visible for 14 miles.

Neef (nāf), or Neefs, Pieter, Flemish painter, born at Antwerp 1570, died 1651. He excelled in architectural subjects, the figures in his pictures being frequently by Teniers and other masters.

Neenah, Winnebago co., Wis., is a flourishing manufacturing city. Pop. 5083.

Neer (nār), Aart van der, Dutch landscape-painter, born at Amsterdam 1613, died 1683. His chief subjects were canal scenes by moonlight, conflagrations at night, and winter landscapes. His son, Eglon Hendrik, born 1643, died 1703, was also an excellent painter, chiefly of genre subjects.

Neerwinden (nār'vin-dėn), a village in the province of Liége, 16 miles from Louvain. It is the scene of the defeat of the allied English, Dutch, and Austrian armies by the French in 1693, and the defeat of Dumouriez by the Austrians in 1793.

Ne exeat Regno ('let him not go out of the kingdom'), in English law, a writ prohibiting the person against whom it is directed from leaving the kingdom, as when a person who owes an actually due equitable debt meditates going abroad to avoid payment.

Negapatam', town and chief port, Tanjore District, Madras Presidency. It was an early settlement of the Portuguese; was taken by the British in 1781. Pop. 53,855.

Negaunee, a city in Marquette co., Mich., in the midst of an extensive iron region, has productive mines and blast furnaces in city limits. Pop. 1890, 6078.

Negligence, in law, the omission to do that which ought to be done. When such want of care results in injury to another, or involves a wrong done to society, it renders the party guilty of negligence liable to either an action for damages or trial for misdemeanour. In law there are recognized three degrees of negligence: *ordinary*, the want of ordinary care or diligence; *slight*, the want of great care or diligence; and *gross*, the want of slight care or diligence. The person charged with negligence must have been under an obligation to exercise care or diligence either assumed by contract or imposed by law. An alleged act of negligence must always be the proximate cause of the injury sustained; but any injury caused to a person by another who at the time is exercising due care is not actionable. The question of negligence is usually one for a jury, and the onus of proof rests on the pursuer, except when the thing resulting from the negligence speaks for itself. A master is responsible for the negligence of his servants, but in no case can redress be had where contributory negligence on the part of the pursuer is proved.

Negrais, a cape at the S.W. extremity of the coast of Bassein, Lower Burmah.

Negri'tos, or Negrillos, the name given to several negro-like races inhabiting the islands, &c., of South-eastern Asia, and often confounded with the Papuan race. The chief tribes are the Aëtas, the indigenous people of the Philippine Archipelago, still inhabiting the interior of the islands of Luzon, Negros, Panay, Mindoro, and Mindanao; the Samangs of Malacca; and the Mincopies inhabiting the Andaman Archipelago. They are dwarfish in stature, averaging from 4 ft. 6 in. to 4 ft. 8 in. in height; the nose small, flattened or turned up at the apex, and the hair soft and frizzled. The various tribes speak distinct and mutually unintelligible dialects.

Negro, the name of numerous rivers, both large and small. See *Rio Negro*.

Negroes, a race of the human species indigenous to the African Soudan, though the term is often extended so as to cover all the tribes inhabiting Africa from the southern margin of the Sahara as far as the territory of the Hottentots and Bushmen, and from the Atlantic to the Indian Ocean. These tribes are all dark-coloured, yellow, copper-red, olive, or dark-brown, passing into ebony-black. The typical negro, however, is described as having a black skin, woolly or crisp hair, a protuberant mouth with thick lips, nose thick and flat, thick

narrow skull, flat and receding forehead, hair of the face scanty, thorax compressed, flat buttocks, long arms, knees bent outward, calves weak, and feet comparatively flat with long heels. The brain, though essentially similar to that of the white races, is not so large, averaging about 5 ounces less than that of the white man. The negro as a rule differs as much from the whites in mental as in physical characteristics, though there are many individual exceptions. He is very receptive, and in that which requires imitation he is well developed, but in that which requires independent thought he stands on a low stage. He has less nervous sensibility than the white man, and can flourish in climates fatal to the higher races, and the race does not diminish in contact with civilization. Certain negro tribes of Africa present a surprising picture of barbaric civilization from contact with Mohammedanism. The slave system has alienated great numbers of negroes from their native country mostly to America and the West India Islands, where there has been considerable intermixture of races. By the census (1890) there were 7,470,040 persons of African descent in the U. States, many of whom hold good positions in life, as negroes also do in the West Indies and elsewhere.

Negro Minstrelsy, a species of music of a quaint and simple kind, which originated among the negroes of the southern United States, and was first made popular at public entertainments by E. P. Christy, the originator of the troupes of imitation negro musicians. The words of the songs are generally in broken English, and the harmonies almost entirely limited to the chords of the tonic and dominant. The bones and banjo are the chief accompanying instruments.

Ne'gropont. See *Eubœa*.

Negros, an island in the Asiatic Archipelago, belonging to the Philippines, and separated from Panay by a strait about 15 miles wide. Length 130 miles, average width 24 miles; area about 3800 sq. miles. In the central mountainous part of the island are a considerable number of Negritos, but the inhabitants are chiefly Malays. Sugar is the chief product. Pop. 145,000.

Negun'do, a genus of North American trees, containing only one species, *N. acerοides*, a small but handsome tree, with light-green twigs and drooping clusters of small greenish flowers.

Negus, a drink made of port or sherry wine mixed with hot water, sugar, nutmeg, and lemon-juice; so called from Colonel Negus, the inventor.

Nehemi'ah, a distinguished and pious Jew, who was born in captivity, but was made the cup-bearer of Artaxerxes Longimanus, king of Persia. He was sent, B.C. 444, as governor to Jerusalem, with a commission to rebuild the walls and gates of this city. He accomplished his purpose, but not without difficulties, arising partly from the poverty of the lower classes of the people, and partly from the opposition of the Ammonites and other foreign settlers. The Book of Nehemiah contains Nehemiah's account of his proceedings, with other matter which forms a supplement to the narration contained in the Book of Ezra.

Neilgherry (nēl'ge-ri) **Hills** (properly *Nilgiri*, that is 'blue mountain'), a district and range of mountains in Madras Presidency, South Hindustan. The district is bounded by Mysore, Coimbatore, and Malabar; area, 957 sq. miles. It consists of a nearly isolated plateau, with an average elevation of over 6000 feet. There are six peaks over 8000 feet in height, the highest being Dodabetta, 8760 feet. The chief town is Utakamand (Ootacamund), which is a valuable sanitarium. The district produces coffee, tea, and cinchona. Pop. 91,034.

Neisse (nī'sé), a fortified town, district of Oppeln, Prussian Silesia, on a river of same name, 47 miles S.S.E. of Breslau. It is generally well built, and has some interesting buildings, especially the fine church of St. James, completed in 1440. Its manufactures are unimportant, but it has an active trade. Pop. 21,837.

Neith, or NEITHA, an Egyptian goddess who was worshipped especially as a local divinity at Sais in Lower Egypt. She had some of the characteristics of the Greek Athēnē or Minerva.

Nejd, or NEJED (Arab. 'elevated country'), a term sometimes used as an element in Arabic place-names, but used absolutely to signify the country in the interior of Arabia forming the central Wahabi kingdom. A great part of its surface is sandy desert interspersed with fertile spots. The more elevated districts feed immense droves of camels and the best breeds of Arab horses. Its chief town is Riad (28,000 inhabitants), the Wahabi capital.

Nejin, NIEJIN, or NYESHIN, a town in Russia, in the government of Czernigov, on the left bank of the Oster, about 80 miles N.E. of Kiev. Pop. 43,030.

Nélaton, Auguste, a noted French physician and surgeon, born 1807, died at Paris 1873. He studied medicine at Paris, and graduated as doctor in 1836. Soon after he was appointed hospital surgeon and private lecturer in the faculty of medicine in the University of Paris. From 1851 to 1867 he was professor of clinical medicine. In 1866 he was appointed surgeon to Napoleon III., and was created a senator by imperial decree in 1868. He was specially renowned for his skill in operating for the removal of calculus, and was the inventor of a new method of operating in this disease. He published several works on surgery.

Nellor, a town in India, in the Presidency of Madras, capital of district of the same name. It is a tolerably clean and airy town, and has railway and canal communication with other parts of the country. Pop. 27,505. The district lies on the Coromandel coast; area, 8739 sq. miles. It is famous for its breed of cattle. Pop. 1,220,236.

Nelson, a town and provincial district in New Zealand, in the north-west of South Island. The town, which is a seaport, is situated on a small harbour at the bottom of Blind Bay, in the county of Waimea. It has a cathedral and churches of various denominations, a literary institute and museum, theatre, and numerous fine public and business buildings. Leather making, brewing, fruit-preserving, &c., are among the industries. Steamers ply regularly to all the neighbouring ports. Pop. including suburbs, 10,900.—The district has an area of 10,468 sq. miles. Although agriculture is now carried on to a considerable extent, still the great wealth of the district lies in its minerals. Unlimited beds of excellent iron ore, lead and copper ores, coal, and gold, both alluvial and quartz, are all wrought to a considerable extent. Pop. 1891, 34,770.

Nelson, or Nelson in Marsden, a town in N. E. Lancashire, England, 3½ miles N.E. of Burnley. There are various manufactories, and coal is worked in the neighbourhood. Pop. 1891, 22,700.

Nelson, Horatio, Viscount, a great British admiral, was born Sept. 29, 1758, at Burnham Thorpe, in Norfolk (where his father was rector); died Oct. 21, 1805. At the age of twelve he entered the navy as a midshipman, and in 1773 accompanied Commodore Phipps in an expedition towards the north pole. In 1777 he was made a lieutenant, and in 1779 raised to the rank of post-captain. He distinguished himself in an attack on Fort Juan, in the Gulf of Mexico, and on other occasions, and remained on the American station till the conclusion of peace. He afterwards commanded the *Boreas* frigate, and was employed to protect the trade of the Leeward Islands. On the commencement of the war with the French Republic

Admiral Lord Nelson.

he was made commander of the *Agamemnon*, of sixty-four guns (1793), with which he joined Lord Hood in the Mediterranean, and assisted at the siege of Bastia (May, 1794). At the siege of Calvi (July 10, 1794) he lost an eye. For his gallantry at the battle of Cape St. Vincent (Feb. 14, 1797) he was made rear-admiral of the blue, and appointed to the command of the inner squadron at the blockade of Cadiz. His next service was an attack on the town of Santa Cruz, in the Island of Teneriffe, in which he lost his right arm. In 1798 he joined Lord St. Vincent (Admiral Jervis), who sent him to the Mediterranean to watch the progress of the armament at Toulon. Notwithstanding his vigilance, the French fleet which conveyed Bonaparte to Egypt escaped. Thither Nelson followed, and after various disappointments he discovered the enemy's fleet moored in the Bay of Aboukir, where he obtained a most complete victory, all the French ships but two being taken or destroyed (August 1, 1798). This achievement was rewarded with the title of *Baron Nelson of the Nile* and a pension of £2000. His next service was the restoration of the King of Naples, which was accompanied with circumstances

of revolting cruelty generally attributed to the influence of Lady Hamilton, which see, the wife of the English ambassador. In 1801 he was employed on the expedition to Copenhagen under Sir Hyde Parker, in which he effected the destruction of the Danish ships and batteries. On his return home he was created viscount. When hostilities recommenced after the Peace of Amiens Lord Nelson was appointed to command the fleet in the Mediterranean, and for nearly two years he was engaged in the blockade of Toulon. In spite of his vigilance the French fleet got out of port March 30, 1805, and being joined by a Spanish squadron from Cadiz, sailed for the West Indies. The British arrived shortly previous to their return to Europe and took shelter at Cadiz. On the 19th of October the French, commanded by Villeneuve, and the Spaniards by Gravina, ventured again from Cadiz, and on the 21st they came up with the British squadron off Cape Trafalgar. An engagement took place, in which the victory was obtained by the British, but their commander was wounded in the back by a musket-ball, and shortly after expired. His remains were carried to England and interred in St. Paul's Cathedral.

Nelson River, a river of Canada, which issues from Lake Winnipeg, and after a torrentous course of about 500 miles, during which it passes through a series of lakes, falls into Hudson's Bay. Numerous rapids and falls render navigation

Nelumbium, a genus of aquatic plants

inhabiting the fresh waters of the temperate parts of the world, type of the natural order Nelumbiaceæ, having large polypetalous flowers with numerous stamens. The best-known species is *N. speciosum*, the Hindu kat chhoora lota, a magnificent water-plant of the rivers and lakes of all the warmer parts of Asia, the Malay Archipelago, Australia, and was found in the Nile (known at least

Egg capsule of a nautilus.

with it the ancients being more used as a culinary vegetable. It is a most beautiful plant with rose-coloured flowers of

full stature and is frequently cultivated in hothouses. The root is generally cooked, and tastes as potatoes. In Jamaica, the yellow-flowered species, *N. luteum*, the American Lotus of the eastern United States, has similar uses, the tubers also being used for food.

Nematoda, the division of Nematoidea that includes those parasitic worms which possess tubes of excretion and generative organs. Among the most familiar are the roundworms or thread-worms. These possess simple tube-like bodies, and are found as parasites in the tissues of various animals, during the two stages in their development. The ascaris, or round-worm, may escape from the bodies it infests in both stages, the larger of pairs of copulating ones may be discovered in the feces of human beings. The embryos contained in these eggs are provided with a retractile proboscis and groups of hooks at the other end, penetrate the bodies of insects, and there develop into the sexually mature worms. Nematoidea, formerly considered as one family, now constitute a distinct order, and are remarkable, especially as breeding in small and very large numbers. Another order of the Nematoidea is that of the Acanthocephala, which possess several hooklike forms on the proboscis, or anterior rounded form of the body. Examples are the Echinorhynchus gigas, found in the intestine of the pig, and the Gordius, or horsehair worm. The Nematoidea, although usually parasitic, also comprise many free and non-parasitic forms.

Nemertes (named after a mythological character), a genus of the Nemertoidea, found on the sea-coast, on the shores of which it is a long, flat, round, often coloured or striped worm, and capable of being divided into several pieces, each of which has the power of

stinging possessed by many of the Cœlenterata is due.

Nemato'da. See *Nematelmia.*

Neme'an Games, ancient Greek games, held in the valley of Nemea in Argolis, where Hercules is said to have killed the Nemean lion. They recurred ordinarily every second year, and were similar in character to the other Greek games. (See *Games.*) Eleven of Pindar's odes are in celebration of victors at the Nemean games.

Nemer'tida, a group of the Scolecida (Annuloida), represented by the 'ribbon-worms' found on the sea-coasts of various countries. They possess flat, ribbon-like bodies, which, as in the *Borlasia* of the British coasts, may attain a length of more than 15 feet. Some of the species of the type-genus *Nemertes* attain a length, in their extended state, of 30 or 40 feet, which they can suddenly contract to 3 or 4 feet.

Nem'esis, a female Greek divinity who appears to have been regarded as a personification of the righteous anger of the gods, inflexibly severe to the proud and insolent, *i.e.* retributive justice. In the theogony of Hesiod she is the daughter of Night, the avenging Fate who checks and punishes the favourites of Fortune.

Nemi, a lake in Italy, about 17 miles south of Rome. It is evidently the crater of an extinct volcano; has a circuit of 5 miles, and discharges its waters through an ancient tunnel. A village of the same name lies on the N.E. shore.

Nemours (nė-mör), a French town in the department of Seine-et-Marne, 10 miles south of Fontainebleau, of some historical importance. Pop. 4287.

Nen, an English river, rises in the N.W. of Northamptonshire, and falls into the Wash after a course of 70 miles.

Nenagh (nen'ä), a town in Ireland, county of Tipperary, 28 miles north-east of Limerick. It has the remains of an old castle, and does a good general trade. Pop. 5422.

Nennius, the supposed author of a collection of chronicles and genealogies styled Historia Britonum, written in Latin, and reaching down to A.D. 655. The author is supposed to have been a monk at Bangor in Wales. The authorship and authenticity of Nennius have been much disputed.

Neoco'mian, in geology, a term applied to the lower greensand and Wealden.

Ne'ogene, in geology, a name given by some geologists to the Pliocene and Miocene tertiaries to distinguish them from the older Eocene strata.

Neolith'ic, in archæology, a term applied to the more recent of the two periods into which the stone age has been subdivided, as opposed to *palæolithic.* During this period there is found no trace of the knowledge of any metal excepting gold, which it would seem had sometimes been used for ornaments. The Neolithic stone implements are finely shaped and polished, and are found in connection with the remains of extinct animals.

Neomorpha. See *Huia-bird.*

Ne'ophron, a genus of birds of the vulture family, one species of which (*N. percnoptĕrus*) inhabits Southern Europe, Egypt, and Asia. It is known as the Alpine or Egyptian vulture, Pharaoh's chicken, &c.

Neo-platonism. See *New Platonists.*

Neotrop'ical, a term applied to one of the six regions into which zoologists divide the surface of the earth, based on their characteristic fauna or collection of animal life. The Neotropical region includes Central America south of the Isthmus of Tehuantepec, and South America.

Neot'tia a small genus of Orchidaceæ, readily distinguished by its habit, all the species being leafless brown-stemmed plants, with sheathing scales in place of leaves. One species, the bird's-nest orchis (*N. nidus-avis*), is a native of Britain.

Neozo'ic (Gr. *neos,* new, *zōē,* life), in geology, a name under which Prof. E. Forbes proposed to include all the strata from the beginning of the Trias up to the most recent deposits; the *Mesozoic* and *Cainozoic* of other palæontologists. Forbes suggested this classification on the ground that while there is a widely-marked distinction between Palæozoic and Mesozoic fossils, there is no essential difference between Mesozoic and Cainozoic.

Nepa, a genus of hemipterous insects, popularly known by the name of 'water-scorpions.'

Nepal', Nipal', or Nepaul', a small independent state situated on the N.E. frontier of Hindustan, on the south-west slope of the highest part of the Himálaya range, between lat 26° 25′ and 30° 17′ N., and lon. 80° 61′ and 88° 14′ E.; area, about 54,000 square miles. The country is a table-land from 3000 to 6000 feet above the level of the sea. It contains within its boundaries the highest mountains in the world—Mount Everest, Dhawalagiri, and on its eastern

borders Kanchinjinga. From the mountains southwards the land gradually descends, forming four distinct terraces, differing in climate and vegetation. The climate is on the whole temperate except in the most elevated districts in the north, where it is very cold. The most important rivers are the Ghogra or Kanar, the Gandak, and the Kusi, all of which rise in Tibet on the north beyond the Himálayas. Magnificent forests of sal, sisoo, and toon trees stretch along the declivities of the lower hills into the adjacent plains. The forests higher up exhibit a greater variety, gradually assuming more and more of an Alpine character. The principal products are rice, wheat, barley, pulse, sugar-cane, buckwheat, hemp, cotton, tobacco, and madder. Pasturage is on the whole scarce and indifferent. The sheep and goats, however, have fine wool. Horses are imported from Tibet. The wild animals are elephants, black bears of great size, hogs, hog-deer, foxes, jackals, and a few tigers. The manufactures of Nepal are confined chiefly to coarse cotton cloth. The trade is chiefly carried on with British India and Tibet. The inhabitants are descended from successive tides of invaders, the Goorkhas (which see) and Newars predominating. The government is despotic, the Maharaja being the nominal ruler only, as the supreme power is in the hands of the prime-minister. A British resident is stationed at Khatmandu, the capital. Pop. estimated at about 2,000,000.

Nepen'the, a drug which was fabled by the ancient poets to banish the remembrance of grief and to cheer the soul. It is thought by many to have been opium.

Nepenthes. See *Pitcher-plant.*

Nep'eta, a genus of labiate plants, of which the catmint is a typical species.

Neph'elin, or NEPH'ELITE, a mineral found mixed with other substances, in plutonic or volcanic rocks, in small masses or veins, and in hexahedral crystals. It is usually white or yellow.

Nephe'lium. See *Litchi, Longan.*

Nephrite, a mineral, an aluminous variety of amphibole among the bisilicates, of a leek-green colour, massive, and in rolled pieces, remarkable for its hardness and tenacity. It was formerly worn as a remedy for diseases of the kidneys. A unisilicate, zoisite, is also spoken of as nephrite, as is jade. All three are capable of fine polish, and have been used since prehistoric times for ornaments, weapon-handles, and even weapons.

Nephthys, an Egyptian deity, the wife of Seth. Her proper sphere was the nether world, though she occurs in the upper world as the instructress of Horus. She is associated as one of a tetrad with Osiris, Isis, and Horus. She was called by the Greek writers *Teleutē* (End), *Aphroditē*, and *Nikē* (Victory).

Ne'pomuk, JOHANN VON, the patron saint of Bohemia. He was born at Pomuk in Bohemia about 1330, martyred 1393. In 1378 he became court-preacher to King Wenceslaus (Wenzel), but incurring the displeasure of that monarch he was cruelly tortured and thrown from the bridge over the Moldau into the river (1393). In the course of the 15th, 16th, and 17th centuries many legends gathered round his name, and in 1729 Benedict XIII. canonized him. The day consecrated to his memory is the 16th of May.

Nepos. See *Cornelius Nepos.*

Neptune, the chief marine divinity of the ancient Romans. When the Greek mythology was introduced into Rome he was completely identified with the Greek Poseidōn, all the traditions relating to whom were transferred by the Romans to their own deity. In art he is usually represented as armed with a trident, and the horse and the dolphin are his symbols. See *Poseidōn.*

Neptune, in astronomy, the most distant of the known planets, its mean distance from the sun being 2,745,998,000 miles, and its least distance from the earth 2,629,000,000 miles. The eccentricity of its orbit is ·00872; its inclination to the plane of the ecliptic is 1° 47′. Its apparent diameter is about 2·7″. Its real diameter is estimated at 36,600 miles, and it seems to have very little polar compression. Its mass is about $16\frac{3}{4}$ times that of the earth, and it revolves round the sun in 164·6 years. It has one satellite, whose period is 5 days 21 h. 2 m. 44 s., and whose mean distance from the planet is 230,000 miles. Neptune was discovered in 1846 in a position indicated independently by Leverrier and Adams, and deduced from a series of recondite mathematical calculations to find a body which could account for the long-observed perturbations of Urănus.

Neptunian Theory, a name given to a geological theory of Werner's, which referred the formation of all rocks and strata to the agency of water; opposed to the *plutonic, igneous*, or *Huttonian theory.*

Nérac, a town of France, department of

Lot-et-Garonne, 16 miles W.S.W. of Agen, on the banks of the Baise. Here Henry IV. held his court when king of Navarre, and Calvin and other reformers found an asylum with Queen Margaret. Pop. 4803.

Nerbudda, or NARBADA (*nar-bə-dä*), a river of Hindustan, which rises on the north-west confines of the ancient territorial division of Gondwana, in the Central Provinces, flows first west and north-west across a plateau, then west, inclining gently to the south, forming part of the boundary between the Central Provinces and Indor, and falls into the Gulf of Cambay after a course of about 800 miles. In religious sanctity it ranks second only to the Ganges. Nerbudda is also the name of a division of the Central Provinces of India; area, 17,513 sq. miles; pop. 1,763,105.

Nerchinsk, a Siberian mining town, prov. of Transbaikal, 540 miles E. of Irkutsk. The neighbourhood yields gold, silver, lead, iron, and tin, and a considerable fur trade is carried on. Pop. 4000.

Nere'idæ, NE'REIDS, the sea-centipedes, of which the genus *Nereis* is the type.

Ne'reïds, in classical mythology, sea nymphs, daughters of Nereus and Doris, and constant attendants on Poseidon or Neptune. They are represented as riding on sea-horses, sometimes with the human form entire, and sometimes with the tail of a fish. They were distinguished on the one hand from the Naiads or the nymphs of fresh water, and on the other hand from the Oceanides or nymphs of the ocean.

Ne'reïs, a genus of dorsibranchiate annelids, consisting of worm-like animals with long segmented bodies, antennæ or feelers, eyes when distinct four in number; mouth usually with horny jaws. Some of the species are found in most seas. One species, *N. prolifĕra*, propagates by spontaneous division, the hind part of the body being gradually transformed into an additional animal.

Nereocys'tis, a sea-weed of the nat. order Laminariaceæ, found on the north-western shores of America and opposite shores of Asia, remarkable for the stems, which attain the length of 45 fathoms, swelling at the top into large cysts or bags filled with liquid; these becoming entangled form large floating islands on which sea-otters rest.

Nereus (*nē'rūs*), in classical mythology, an inferior divinity of the sea, the progenitor of the Nereids, a god subordinate to Poseidon (Neptune). In the ancient works of art, and also by the ancient poets, he is represented as an old man, with a wreath of sedge, sitting upon the waves with a sceptre in his hand.

Nergal, the god of war among the ancient Babylonians.

Neri, ST. FILIPPO DE', the founder of the Congregation of the Oratory in Italy, was born in Florence in 1515, of a noble family, died 1595. He early devoted himself to the study of theology and the canon law; established hospitals for the relief of pilgrims and the destitute sick, and founded the order of 'Priests of the Oratory,' which was approved by Gregory XIII. in 1595. He was canonized in 1622.

Neriad', a town of India, Kaira district, Presidency of Bombay, and a station on the Bombay, Baroda, and Central India Railway, 35 miles N.W. of Baroda. It is the centre of an extensive tobacco trade. Pop. 28,304.

Nerium. See *Oleander.*

Nero, LUCIUS DOMITIUS AHENOBARBUS (after his adoption by the Emperor Claudius called *Nero Claudius Cæsar Drusus Germanicus*), Roman emperor, the son of Cneius Domitius Ahenobarbus and Agrippina, the daughter of Germanicus. He was born in 37 at Antium, and after the marriage of his mother, in third nuptials, with her uncle, the emperor Claudius, was adopted by that prince, and married to his daughter Octavia.

Nero.

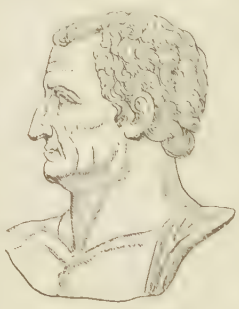
When Nero was about seventeen years of age his abandoned mother poisoned her husband, Claudius, and succeeded in raising her son to the throne, over whom she expected to exercise the most absolute control. Nero became emperor in 54, and the year following disposed of the rightful heir, Britannicus, by poison. For the first few years his public conduct, under the control of Burrhus and

Seneca, was unexceptionable; in private, however, he disgraced himself by the most odious vices, and his mother endeavoured to retain her influence by shamefully complying with his inclinations. In 59 Nero caused this detestable woman to be murdered, and then, fearing no rival in power, gave full scope to the darkest traits of his character. In 62 he repudiated his wife Octavia. In 64 the burning of Rome occurred, which has been charged, with great probability, upon Nero himself, who, however, accused the Christians of the act, and made it the occasion of the most dreadful cruelties towards them. His debaucheries and cruelties occasioned an almost general conspiracy against him, known as that of Piso, in 65, the discovery of which led to more tortures and bloodshed. The revolt of Vindex was also suppressed. That of Galba in 68 succeeded, and Nero escaped arrest by stabbing himself, being then in the thirty-first year of his age and the fourteenth of his reign. He was a lover of arts and letters, and possessed much taste as a poet and histrionic performer.

Nerthus, an ancient German goddess, regarded as representing the earth.

Nerva, the successor of Domitian, and one of the most virtuous of the Roman emperors. He was born in Umbria in 32 A.D., died A.D. 98. He was twice consul, and was elected emperor on the death of Domitian in 96. He adopted Trajan, who succeeded him.

Nerve, NERVOUS SYSTEM. A nerve is one of the fibres which proceed from the brain and spinal cord, or from the central ganglia of lower animals, and ramify through all parts of the body, and whose function is to convey impulses resulting in sensation, motion, secretion, &c. The aggregate of these nerves, and the centres from which they proceed, forms the nervous system, the medium through which every act or detail of animal life is inaugurated and directed. The essential idea of any nervous system involves the necessary presence, firstly, of a *nerve centre* or *centres*, which generate the nervous force or impulse; secondly, of conducting fibres or cords,



Nerva.—Antique Gem

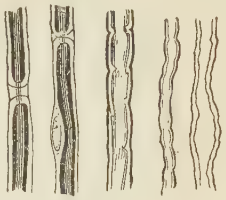
Main Nerves of the Human Body.

the *nerves;* and thirdly, of an *organ, part*, or *structure* to which the impulse or impression may be conveyed. The nerve-centres of man and vertebrates generally are disposed so as to form two chief sets, which are to be regarded as essentially distinct. The brain and spinal marrow together (see *Brain*) constitute the first of these centres, and are collectively included under the name *cerebro-spinal system* or *axis*. The second system is the *sympathetic* or *ganglionic*. From each of these systems nerve-cords are given off—the *cerebral* and *spinal* nerves from the former; and the so-called *sympathetic* fibres from the latter. The brain and spinal cord are contained within the continuous bony case and canal formed by the skull and spinal column; whilst the chief masses of the sympathetic system form an irregularly disposed chain, lying in front of the spine, and contained within the cavities of the thorax or chest and abdomen. The general functions of the cerebro-spinal system are those concerned with volition and muscular movements, with the

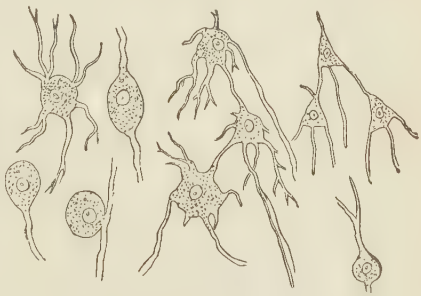
control of the senses, and in higher forms with the operations of the mind. The nerves of the sympathetic system in chief are distributed to the viscera, such as the heart, stomach, intestines, blood-vessels, &c.; and the operation of this system is in greater part of involuntary kind, and without the influence or command of the will. The cranial or cerebral nerves pass from the brain through different openings in the skull, and are all in pairs, the first pair being the *olfactory* nerves or nerves of smell; the second, the *optic* nerves, or nerves of sight; while others have to do with hearing, taste, general sensibility, and muscular motion. The spinal nerves, after issuing from their openings in the vertebral column, split into two divisions, one of which proceeds to supply parts behind the spine, while the other passes towards the front. The first eight spinal nerves on each side are called *cervical*, the next twelve are *dorsal*, the next five *lumbar*, then five *sacral*, and one *coccygeal*.

All nervous structures consist of two elements, *nerve-cells* and *nerve-fibres*. The cells and fibres are combined and associated in various ways, and are imbedded in and supported by fine connective tissue so as to form a connected structure. The cells vary in size from $\frac{1}{5000}$ to $\frac{1}{400}$ of an inch, and consist of masses of protoplasm containing a nucleus and nucleolus. Processes or poles pass from the cell, branching outward. Nerve-fibres are of a glossy transparency and of a tubular form. They consist of a rod passing down the centre, called the axis-cylinder, which is surrounded on all sides by a white substance, the whole being inclosed in a delicate sheath (*neurilemma*). The axis-cylinder is a continuation of the nerve-cell process, and acts in an analogous manner to an electric conductor. The nerve-fibres may exhibit a diameter so great as the $\frac{1}{150}$th of an inch; but their average breadth may be stated to vary from $\frac{1}{2000}$th to the $\frac{1}{3000}$th of an inch. The largest fibres are those of the nerve-trunks themselves; and they diminish in size in the neighbourhood of the nerve-centres—brain and spinal marrow—and as they approach to the periphery of the body or to their ultimate terminations. The nerve-fibres of the brain and spinal marrow do not exhibit a limiting membrane; and in the gray matter of the brain and cord the fibres are of exceedingly small size, not exceeding the $\frac{1}{1000}$th or $\frac{1}{1400}$th of an inch in diameter.

The general functions of nerve-fibres may be briefly considered under two aspects. The fibres may convey impressions *from* the brain or nerve-centres *to* their peripheral extremities, or to the parts to which they are distributed. Or secondly, they may transmit impressions *from* the periphery, or from the parts they supply, *to* their centres. A double series of nerve-fibres, each set subserving one or other of the preceding functions, exists in the cerebro-spinal as well as in the sympathetic nervous system. These series are therefore known as *sensory*, *afferent*, or *centripetal* nerves, when they transmit impressions from their peripheral extremities to the brain or centres; and as *motor*, *efferent*, or *centrifugal* nerves, when they carry impressions from the centres to their peripheral terminations. *Stimuli* of various kinds applied to the nerves arouse the so-called *excitability* of the fibres, and through this property nerves convey impressions thus made upon them. Impressions have been calculated to pass along a nerve at the rate of about 200 feet per second. Nerve-fibres in any case—motor or sensory—can carry one kind of impulse only, corresponding to the kind of fibre. In certain nerves the impulses or impressions are of a limited or specialized kind, as in the nerves of special sense—for example, sight, hearing, smell—whereby certain distinct sensations, of light, sound, or odours, are produced. And such nerves, therefore, respond only to stimuli of



Nerve-fibres.



Various Forms of Nerve-cells.

a special kind. The various nerve-centres of the body which originate, or at any rate direct and dispose, the nerve-force, may be viewed as simply ganglia, or as collections of ganglia, or nervous masses. The brain itself falls under this latter division. The general functional relations existing between the nerve-centres and the nerves may be simply illustrated by the phenomena comprehended under the name of *reflex action*. When a peripheral nerve-fibre is irritated a sensory or centripetal impression is conveyed towards the nerve-centre. Arriving at the centre the impression is converted into a motor or centrifugal one, and travels along the motor nerve-fibres, to excite, it may be, a muscle or other part to action. The general functional relation of the nervous system may be summarized by stating that its functions comprehend the reception and distribution of impressions; that these impressions orginate either from influences acting on the periphery, or from the nerve-centres, brain, or mind; that these impressions respectively influence or stimulate the mind or nerve-centres, and the muscles or secreting structures; and lastly, that all nervous phenomena are exerted through, or accompanied by nervous action, and that this latter is, so far as physiology has yet been able to determine, of a uniform and similar kind. See also *Eye*, *Ear*, *Nose*, &c.

The Invertebrata possess no such specialization of the nervous centres as is seen in Vertebrates, in which the brain and spinal cord are inclosed within their bony case and canal, and thus shut off from the general cavity of the body. The great and distinctive feature between the nervous system of Vertebrata and that of lower forms consists in the absence of a defined or chief nervous centre, through which consciousness may intervene to render the being intelligent, and aware of the nature of the acts it performs.

Nervii, an ancient people of Gallia Belgica, famous for the stand they made against Cæsar's advance in B.C. 57 and 54. They submitted to the Romans in B.C. 53. Their territory was coextensive with the old diocese of Cambrai.

Nervous Diseases are diseases due either to actual changes in the structure of nerve-fibres or nerve-centres, or to some irregularity of nerve function without actual structural change. Thus nervous diseases may be due to inflammation or degeneration of nerve substance; to the pressure on some part of the nervous system of tumours, effused blood, or other fluid; to the death of some part by the cutting off of its blood supply, &c.; or may be the result of lowered nervous action as a part of general bad health.

Nervous System. See *Nerve*.

Nervures, in entomology, the corneous tubes which form prolongations of the tracheæ or air-vessels of insects, and which help to expand the wing and keep it tense. The term is applied in botany to the veins or nerves of a leaf.

Ness, a cape or headland; in Britain a frequent element in the names of points of land projecting into the sea. It is of Norse origin.

Ness, Loch, a lake of Scotland, in Inverness-shire, on the line of the Caledonian Canal. It is long and narrow, stretching S.S.W. and N.N.E. about 22 miles, with a breadth varying from 1½ to 2 miles. Except at the extremities, where it shallows, its depth is from 100 to 130 fathoms. The outlet of the lake is by the river Ness into the Moray Frith.

Nest, the abode or habitation, varying greatly in form, materials, and situation, constructed by birds chiefly for the purposes of incubation and the rearing of the young. The nests of birds are of the most diverse character, some birds making little or no nest, while others construct receptacles for the eggs requiring a vast amount of skill and industry. The materials used are also extremely various, being such as mud or clay, twigs or branches, leaves, grass, moss, wool, feathers, &c. Some birds, for the sake of protection, excavate burrows in banks or sandy cliffs in which to make their nests. Many mammals also are nest-builders, notably mice, moles, dormice, squirrels, foxes, weasels, badgers, rabbits, &c.; and nests are also constructed by certain fishes, reptiles, crustaceans, insects, &c. See *Birds' Nests, Edible*.

Nestor, one of the Greek heroes at Troy, son of Neleus, king of Pylos. He took part in the hunting of the Calydonian boar, and in the Argonautic expedition. He is noted as the wisest adviser of the chiefs before Troy, after the fall of which he retired to Pylos, where he lived to a great age.

Nestor, Russian historian, born about 1056, was a monk at Kiev, and died after 1116. He wrote a chronicle in his vernacular tongue, which has been the foundation of Slavonic history.

Nestorians, a Christian sect of Western

Asia, named from their founder Nestorius (see next art.), formerly of greater importance than they are at present. One portion of them are united with the Roman Catholic Church though using the Greek ritual. They are commonly known as Chaldæan Christians, and have a patriarch residing at Diarbekir. The larger body of them remain as a distinct sect, in Mesopotamia, Syria, Persia, &c. They recognize only three sacraments, baptism, the Lord's supper, and ordination; and their priests are allowed to marry. There is a Nestorian body in India called Christians of St. Thomas.

Nesto'rius, heresiarch, was presbyter at Antioch and bishop of Constantinople from A.D. 428 to 431. He incurred the charge of heresy by maintaining that in the person of Christ the two natures were not so united as to form but one person. Cyril of Alexandria, at the council of Ephesus in 431, procured the condemnation of the doctrine taught by Nestorius and the deposition of the patriarch. He was banished to the deserts of Egypt, where he suffered much and died (440). Numerous extracts from several of his works, entire epistles, and some sermons are extant. His followers, called Nestorians, were persecuted by several Greek emperors in succession.

Net, a term applied to that which remains of a weight, quantity, &c., after making certain deductions. Thus *net weight* is the weight of merchandise after allowance has been made for casks, bags, or any inclosing material.

Net, an open fabric made of thread, twine, or cord, woven into meshes of fixed dimensions, firmly knotted at the intersections. Nets are used for a great variety of purposes, as for protecting fruit-trees, for collecting insects, for hammocks, screens, &c., but chiefly for hunting and fishing. The chief kinds of nets used in fishing are the trawl, the drift, the seine, the kettle or weir, and the trammel or set nets. The trawl is a triangular bag with an arrangement for keeping its mouth open, drawn along the bottom of the water. The drift and seine nets are very long in proportion to their breadth, and differ from one another only in the manner in which they are employed. The seine has a line of corks along one of its long borders, and a line of leaden weights along the other; so that when thrown into the water it assumes a perpendicular position. It is used near the shore, being dragged to land with any fish it may inclose, by ropes fastened to the ends. The drift-net is not loaded with lead, but floats in the water, and is used especially in herring-fishing, the fishes as they drive against it becoming caught by the gills. Kettle and weir nets are structures fixed on stakes placed along the coast between high and low water. Trammel or set nets are also fixed between stays, but act like drift-nets. Formerly all nets were made by hand, but since 1820, when James Paterson established a machine-net factory at Musselburgh, hand-made nets have been superseded. Wire-nets are used for garden purposes, for hen-coops, &c.

Netherlands, The, or Holland, in Dutch Nederland, or Koninkrijk der Nederlanden, a kingdom of Europe which lies on the North Sea, N. of Belgium and W. of part of Northern Germany. Its area is 12,648 square miles; its pop. in 1891 was 4,621,744. The country is divided into eleven provinces: North Brabant, Gelderland, South Holland, North Holland, Zeeland, Utrecht, Friesland, Overijssel, Groningen, Drenthe, and Limburg. The king is also sovereign (grand-duke) of the Grand-duchy of Luxemburg. In addition to her European territories Holland possesses extensive colonies and dependencies in the Asiatic archipelago and America; including Java, Sumatra, great part of Borneo, Celebes, part of New Guinea, Surinam or Dutch Guiana, the West Indian islands of Curaçao, Saba, St. Eustatius, &c. Estimated colonial pop. about 30,789,000.

General Features.—The Netherlands (or Low Countries, as the name implies) form the most characteristic portion of the great plain of northern and western Europe. It is the lowest part of this immense level, some portions of it being 16 to 20 feet below the surface of the sea, and nearly all parts too low for natural drainage. The coast-line is very irregular, being marked by the great inlet of the Zuider Zee, as well as by various others, and fringed by numerous islands. In great part the coast is so low that were it not for massive sea-dykes large areas would be inundated and lost to the inhabitants. In the interior also dykes are a common feature, being built to protect portions of land from the lakes or rivers, or to enable swampy pieces of land to be reclaimed by draining, the water being commonly pumped up by wind-mills. These inclosed lands are called *polders*, and by the formation of the polders the available area

of the country is being constantly increased, lakes and marshes being converted into fertile fields, and considerable areas being even rescued from the sea. One of these reclamations was the Lake of Haarlem, the drainage of which, yielding more than 40,000 acres of good land now inhabited by some 12,000 persons, begun in 1839, was finished in 1852. Almost the only heights are the sand-hills, about 100 to 180 feet high, forming a broad sterile band along the coast of South and North Holland; and a chain of low hills, of similar origin perhaps, south-east of the Zuider Zee. In the same line with the sand-hills, extending past the mouth of the Zuider Zee, runs a chain of islands, namely, Texel, Vlieland, Schelling, Ameland, &c., which seem to indicate the original line of the coast before the ocean broke in upon the low lands. The coast of Friesland, opposite to these islands, depends for its security altogether on artificial embankments. The highest elevation, 656 feet, is in the extreme south-east. The general aspect of the country is flat, tame, and uninteresting, and about a fifth of the whole surface consists of marsh, sand, heath, or other unproductive land.

Rivers and Canals.—The chief rivers of the Netherlands are the Rhine, Maas (or Meuse), Scheldt, and Ijssel. The Rhine is above half a mile wide where it enters the Netherlands; it soon divides, the south and principal arm taking the name of Waal and uniting with the Maas, while the north arm, communicating with the Ijssel, takes the name of Leck; a branch from it named the Kromme (crooked) Rhein, winds by Utrecht to the Zuider Zee, while another very diminished stream called the Old Rhine flows from Utrecht by Leyden to the sea at Katwijk. The Maas, entering the Dutch Netherlands from Belgium, receives the Roer; of the Scheldt only the mouths, the east and the west, or Old Scheldt, lie within the Dutch boundary. The Ijssel, flowing from Germany, enters the Zuider Zee. The navigable canals are collectively more important than the rivers, on which indeed they depend, but they are so numerous as to defy detailed description. The chief are the North Holland Canal, between Amsterdam and the Helder, length 46 miles; and the more important ship canal, 15 miles long, 26 feet deep and 197 wide, from the North Sea to Amsterdam, and connected by locks with the Zuider Zee. (See *Amsterdam.*) Lakes are also very numerous.

Climate, Agriculture, &c.—The climate of the Netherlands is humid, changeable, and disagreeable. The mean temperature is not lower than in like latitudes in the British Islands, and the quantity of rain (26 inches) is somewhat less; but the winter is much more severe. As regards rural industries gardening and agriculture have attained a high degree of perfection. Yet the latter holds a subordinate place in rural industry. Wheat, of excellent quality, is grown only in favoured portions of the south provinces. Rye, oats, and buckwheat, with horse-beans, beet, madder, and chicory, are more common crops; and tobacco is cultivated in the provinces of Gelderland, South Holland, and Utrecht; flax in North Brabant, South and North Holland, Friesland, and Zeeland; and hemp, sugar-beet, oil-seeds, and hops in various parts of the kingdom. Culinary vegetables are cultivated on a large scale, not merely for the sake of supplying the internal demand, but also for the exportation of the seeds, which form an important article of Dutch commerce. But it is in stock (cattle, horses, sheep, swine, goats), and dairy produce in particular, that the rural industry of the Netherlands shows its strength.

Commerce, Manufactures, &c.—The commerce of the country was at one time the most important in the world, and is even yet of great importance and activity. The external commerce is chiefly carried on with Great Britain, Germany, Belgium, and the Dutch colonies in the East. The total imports in recent years have varied from about £90,000,000 to £94,000,000; the exports from £70,000,000 to £83,000,000. A considerable portion of the trade is transit. Among imports from the United Kingdom the chief are cottons and woollens, metal goods and machinery; the chief exports, butter and butterine, live animals, wine and spirits, silks, sugar. The foreign trade centres chiefly in Amsterdam and Rotterdam. The industrial occupations are varied. Shipbuilding and subsidiary trades are among the chief. Of textile manufactures that of linen is the most important; but silks and velvets, as well as woollens and cottons, are produced in considerable quantity. Pigments, brandy, gin, paper, glass, earthenware, &c., are among the more important products. Large numbers of the sea-board population are employed in the deep-sea fisheries. Railways have a length of 1600 miles. The chief money unit is the florin or guilder = 1*s.* 8*d.*

People, Institutions, &c.—The stock to which the people belong is the Teutonic, the great majority of the inhabitants being descendants of the old Batavians. They comprise over 70 per cent of the population, and are chiefly settled in the provinces of North and South Holland, Zeeland, Utrecht, and Gelderland. The Flemings of North Brabant and Limburg, and the Frisians, inhabiting Friesland, Groningen, Drenthe, and Overijssel, form the other groups. The majority of the people belong to the Dutch Reformed Church (a Presbyterian body); the remainder being Roman Catholics, Old Catholics, Jews, &c. All religious bodies are on a perfect equality. The government is a constitutional monarchy, the executive being vested in the king, and the legislative authority in the States-general, sitting in two chambers. The upper chamber, fifty in number, is elected by the provincial councils or assemblies of the eleven provinces; the lower chamber, 100 in number, is elected directly, the electors being all males of twenty-three years of age taxed at a certain figure. The members of the lower house are paid. The annual expenditure usually amounts to about £10,000,000, and in recent years has generally exceeded the revenue. The public debt amounts to about £92,000,000. The navy consists of 120 men-of-war, 24 of them iron-clads; and the army of 2338 officers and 62,734 men, with a militia numbering about 117,000. Elementary schools are everywhere established, and are partly supported by the state, but education is not compulsory. Higher class schools are in all the chief towns; while there are state universities, namely, at Leyden, Utrecht, and Groningen, and the municipal university at Amsterdam. The commercial capital of the country is Amsterdam, but the seat of government and residence of the sovereign is the Hague.

Language and Literature.—The literary language of the Kingdom of the Netherlands is in English called *Dutch*, but by the people themselves is called *Hollandsch* or *Nederduitsch*, that is, Low Dutch. This name it receives in opposition to the *Hoch-deutsch* or High Dutch, the literary language of modern Germany. Closely allied to the Dutch is the Flemish language (which see). Both languages belong to the Low German group of the Teutonic or Germanic branch of the Indo-European family of languages. The two languages, or rather dialects, are in fact in their early history identical. What may be strictly called Dutch literature, as distinguished from Flemish, dates from the latter quarter of the 16th century. The chief names of this period are those of Coornhert, Von Marnix, Spiegel, and Visscher, who did much to polish and regulate the language, and to produce correct models both of prose and verse. Pieter Corneliszoon Hooft (1581–1647) brought the prose style to a high degree of excellence; and Joost van den Vondel (1587–1679), the greatest of Dutch dramatists, performed the same service for the language of poetry. Jacob Cats, familiarly known in Holland as 'Father Cats' (1577–1660), on the other hand, confined himself to the sphere of everyday life. He was distinctively the poet of the people, and his writings are still popular. Among other leading names in pure literature are those of Constantyn Huygens (1596–1686), a satirist, epigrammatist, and didactic poet; Jacob van Westerbaan (died 1670) and Jan van Hemskerk (died 1656), both erotic poets; and Dirk Kamphuisen (died 1626), a celebrated hymn-writer. Among dramatists were Brandt (died 1685), who was also an historian and epigrammatist; Oudaan (died 1692), a political writer and lyrist; and Antonides van der Goes (died 1684), celebrated also as a lyrist. The principal writer of comedies was Bredero (1585–1618). Dutch poetry declined towards the end of the 17th century partly through French influence, but a revival set in with Jacob Bellamy (1757–86). Willem Bilderdijk (1756–1831) shone in all departments of poetry. J. F. Helmers (1767–1813) won great applause by the descriptive poem De Hollandsche Natie. Hendrik Tollens (1780–1856) was as a lyrist the avowed favourite of his country, and his Overwintering der Hollanders op Nova-Zembla is regarded as the best descriptive poem in the Dutch language. An important service was rendered to the literature of his country by Jacob van Lennep (1802–68), who, incited by the example of Scott and Byron, introduced romanticism, and successfully repressed French classicism by his masterly treatment of native tales and historical subjects in narrative poems. The novelists who rank next to Van Lennep are Oltmans, Mrs. Bosboom-Toussaint, and Douwes Dekker (Multatuli). The list of recent Dutch prose writers also includes Schimmel, N. Beets, W. A. van Rees, Weitzel, Lange, J. ten Brink, Opzoomer, Limburg-Brouwer, and the historians Fruin (called the Dutch Motley) and Hofdijk. Dutch names famous

in classical learning include those of Erasmus, Lipsius, Grotius, Gronovius, &c.; in science, Huygens, Leeuwenhoek, &c.; in philosophy, Spinoza; and in medicine, Boerhaave.

History.—The southern portion of the Low Countries belonged at the beginning of the Christian era to Belgic Gaul. (See *Gaul.*) The northern portion, inhabited by the Batavians and Frisians (see those articles), formed part of Germany. The southern portion as far as the Rhine was held by Rome up to A.D. 400, after which it came under the rule of the Franks, as did also subsequently the rest of the country. In the 11th century the territory comprised in the present kingdoms of Belgium and the Netherlands formed a number of counties, marquisates, and duchies corresponding more or less with the modern provinces. By the latter part of the 15th century all these had been acquired by the Duke of Burgundy, and passed to the house of Hapsburg on the marriage of the daughter of Charles the Bold of Burgundy to the son of the Emperor Frederick III. On the abdication of Charles V. in 1556 they passed to his son Philip II. of Spain. In consequence of religious persecution in 1576 Holland and Zeeland openly rebelled, and in 1579 the five northern provinces —Holland, Zeeland, Utrecht, Guelders, and Friesland—concluded the celebrated Union of Utrecht by which they declared themselves independent of Spain. They were joined in 1580 by Overijssel, and in 1594 by Groningen. After the assassination of William of Orange, July 10, 1584, Maurice became stadtholder (governor). His victories at Nieuport and in Brabant, the bold and victorious exploits of the Dutch admirals against the navy of Philip II., the wars of France and England against Spain, and the apathy of Philip II., caused in 1609 the Peace of Antwerp. But Holland had yet to go through the Thirty Years' war before its independence, now recognized by all the powers except Spain, was fully secured by the Peace of Westphalia. In the middle of the 17th century the United Netherlands were the first commercial state and the first maritime power in the world, and for a long time maintained the dominion of the sea. The southern provinces alternated between the rule of Spain and Austria till 1797, when they came under the power of the French Republic. In 1806 Louis Napoleon became king of Holland, but in 1810 it was incorporated with the French Empire. In 1814 all the provinces both of Holland and Belgium were united by the Treaty of Paris to form the Kingdom of the Netherlands. This arrangement lasted till 1830, when the southern provinces broke away and formed the Kingdom of Belgium. King Willem I. attempted to reduce the revolted provinces by force; but the great powers intervened, and finally matters were adjusted between the two countries in 1839. (See *Belgium.*) The king abdicated in 1840, and was succeeded by his son Willem II. (1840–49), he being again succeeded by his son Willem III., who was succeeded in 1890 by his daughter Wilhelmina. See *Wilhelmina.*

Netley, a village of England, in Hampshire, 6 miles S.E. of Southampton, on Southampton Water. The Royal Victoria Hospital here was erected in 1857 for the reception of invalids from the troops on foreign service, and from the troops quartered in the military districts in the neighbourhood. The accommodation is for 1000 patients, but it is capable of being increased. Candidates for medical appointments in the army attend the medical school attached to the hospital, and the female army-nurses have also their head-quarters here.

Netting, a net of small ropes to be stretched along the upper part of a ship's quarter to contain hammocks. Netting also used to be extended along a ship's gunwale to prevent the enemy from boarding.

Nettle, a genus of plants (*Urtīca*) belonging to the nat. order Urticaceæ, and consisting chiefly of neglected weeds, having opposite or alternate leaves, and inconspicuous flowers, which are disposed in axillary racemes. The species are mostly herbaceous, and are usually covered with extremely fine, sharp, tubular hairs, placed upon minute vesicles filled with an acrid and caustic fluid, which by pressure is injected into the wounds caused by the sharp-pointed hairs. Hence arises the well-known stinging sensation when these plants are incautiously handled. Many species of nettle are known, of which three are found in Britain—the Roman nettle (*U. pilulifera*), the small nettle (*U. urens*), and the great nettle (*U. dioica*). Nettles yield a tough fibre which may be used as a substitute for hemp. Nettle-porridge and nettle-broth are dishes made from young and tender nettles cut in March or April. The nettle is common in the U. States.

Nettle-rash, or URTICARIA (Latin, *urtīca*, a nettle), a common disease of the skin, an eruption closely resembling nettle-stings

both as to appearance and as to the sensations it originates. It consists of small wheals, either red or white, sometimes both, having the centres white and the margins red. The disease may be either acute or chronic. When it is acute generally more or less of fever accompanies it. In almost all cases it arises from a disordered condition of the digestive organs, produced either by indigestible food, or in some persons by particular kinds of food which others eat with complete impunity.

Nettle-tree (*Celtis*), natural order Urticaceæ, a deciduous tree, with simple and generally serrated leaves, much resembling those of the common nettle, but not stinging. It has a sweet fleshy drupaceous fruit. The common or European nettle-tree (*C. australis*) grows to the height of 30 or 40 feet, and is frequently planted for ornament in the south of France and north of Italy. The wood is useful for various purposes. *C. occidentalis*, sometimes called the sugar-berry, is a much larger tree, often attaining a height of from 60 to 80 feet. It is a native of North America from Canada to Carolina. A variety, *C. crassifolia*, is often called hackberry. See *Hackberry*.

Neu-Brandenburg. See *Brandenburg* (*New*).

Neuburg (noi'burh), a town of Bavaria, on the Danube, 45 miles N.N.W. of Munich. It is a place of great antiquity, and for three centuries (1503–1802) was the capital of the independent duchy of Pfalz-Neuburg. The old ducal residence contains an interesting collection of portraits and armour. Pop. 7496.

Neufahrwasser (noi'fär-vâs-ėr), a seaport forming a sort of suburb of Dantzig, from which it is about 3½ miles distant. (See *Dantzig*.) Pop. 5921.

Neufchâtel (neu-shä-tel), Neuchâtel (in German *Neuenburg*), a Swiss canton, bounded by France, Vaud, the Lake of Neufchâtel, and Bern, with an area of 312 sq. miles. Neufchâtel was an independent principality as early as 1034. After various vicissitudes it came into the hands of the King of Prussia, as heir of the house of Orange. In 1814 it was received into the Swiss Confederacy, and was the only canton with a monarchical government, which it preserved till 1848. After threatened war in May 1857, the King of Prussia renounced all his rights in Neufchâtel. Several ridges of the Jura run through the country. The Lake of Neufchâtel, 24 miles long by 8 broad, communicates through the Aar with the Rhine. Grazing and dairy-farming are extensively carried on in the canton; wine, fruits, hemp, and flax are produced. The chief manufactures are lace, cotton, watches and clocks (specially at Chaux de Fonds and Locle). The religion is Protestant. The language is French, but German is also spoken. Pop. 107,977.—The capital, which has the same name, lies 24 miles west of Bern, on a steep slope above the north-western shore of Lake Neufchâtel. It has a castle, formerly the residence of the princes of Neufchâtel and now occupied by the government offices; an old Gothic church of the 12th century; a gymnasium or college, containing a valuable natural history collection founded by Professor Agassiz, a native of the town, &c. It has various manufactures and an extensive trade. Pop. 17,120.

Neuhaus (noi'hous), a town of Bohemia, 26 miles north-east of Budweis, on the Nezarka. It has a grand castle of the Czerny family. Pop. 8703.

Neuhäusel (noi'hoi-zl), a town of Hungary, on the river Neutra. It was formerly strongly fortified, and played an important part in the Turkish wars, but its fortifications were demolished in 1724. It is now merely a market town. Pop. 10,584.

Neuilly (*neu*-yē), a town of France, practically a suburb of Paris, on the right bank of the Seine, here crossed by Perronet's magnificent bridge. Pop. 25,235.

Neumünster (noi'mün-stėr), a town of Prussia, province of Schleswig-Holstein, 17 miles S.S.W. of Kiel. It is the centre of the railway system of Holstein, and the second industrial town in the province, with cloth factories, &c., and a brisk trade. Pop. 13,650.

Neunkirchen (noin'kirh-ên), or Ober-Neunkirchen, a town of Prussia, in the district of Treves, on the Blies, 12 miles north-west of Saarbrücken. It lies in a great coal-basin, in which about 4,000,000 tons of coal are raised annually, and has a large iron-foundry employing about 3000 hands. Pop. 17,667.

Neural'gia, the name given to that species of morbid pains which occur only in the course of one or more distinct nerves, and by this locality are distinguished from other pains. In neuralgia of the fifth nerve the pain is in one half of the face, and if the central branch is affected the pain is confined to the upper jaw; neuralgia of the chief nerve of the thigh (*sciatic nerve*)

extends along the buttocks and back of the thigh down to the knee, and is called *sciatica*. It also affects the front, back, and outside of the leg, and the whole foot except its inner border; while neuralgia of the intercostal nerves manifests itself in a belt or circle of pain around the breast. The presence of neuralgia almost invariably indicates a weak state of the general system. The most common and best ascertained of the neuralgias are those of the nerves of the skin (*dermalgia*); but nerve pains occur also in other parts, as in the joints, muscles, and in the bowels (*enteralgia*). Many of the internal parts may be the seat of similar local affections; such, for example, are nervous affections of the heart and respiratory organs, which, however, do not usually manifest themselves by acute pain, but by special symptoms. The primary causes of the injury to the nerve producing neuralgia may be very various. It may be inflammation of the nerve itself, a swelling in or upon it, irritation of it produced by an ulcer or suppuration or swelling of the adjacent parts, especially the cavities of the bones, &c. Thin-blooded persons and those of weak nerves are most liable to be affected by neuralgia, which varies much both in degree and duration. It is often chronic, and often suddenly occurs during the progress of other acute diseases, as in typhus or intermitting fevers. The treatment also of course varies with the nature of the different cases, some admitting of easy cure by the administration of nourishing food, and by the use of iron and quinine, and other tonics, while for others the aid of surgery has to be called in.

Neurapoph'yses, or NEURAL ARCHES, the name applied to the upper or superior arches which spring from the body of the typical vertebra, or segment of the vertebrate spine, and which by their union form a canal — the 'neural canal'—inclosing the spinal marrow.

Neurin, NEURINE, the nitrogenized substance of nerve fibre and cells, consisting chiefly of albumen and a peculiar fatty matter, associated with phosphorus.

Neuri'tis, inflammation of a nerve. Tenderness in the course of the nerve and pain recurring in paroxysms are among the symptoms. Paralysis may occur as a result, and in the case of a special nerve of sense loss of the particular sense. Neuritis of the optic nerve, for instance, is a frequent cause of blindness.

Neurop'tera, an order of insects which undergo an incomplete metamorphosis, distinguished by the possession of four well-developed membranous wings, which are generally of equal or nearly equal size. The name Neuroptera ('nerve-winged') is applied to the group in allusion to the large size of the nervures or supporting 'ribs' of the wings, which are very conspicuous and give to the wings a reticulated or network-like appearance. The mouth is generally masticatory, the head large and distinctly separable from the thorax, the antennæ generally slender. The tarsi possess from two to five joints. No sting exists. In some Neuroptera the metamorphosis may approach very nearly to the holometabolic or 'complete' variety. In general the larvæ are aquatic, the pupa in the majority of cases closely resembling the perfect insect. The chief families included in the order comprise the Libellulidæ or dragon-flies; the caddis-flies (Phryganeidæ); the may-fly family (Ephemeridæ); the Myrmeleontidæ, or 'ant-lions;' the Hemerobiidæ, or 'lace-winged flies;' and the Termitidæ, represented by the celebrated 'white-ants' or termites of tropical regions. See the different articles.

Neuro'sis (Gr. *neuron*, a nerve), a name common to diseases of the nervous system unaccompanied by any discoverable alteration in structure, that is to say *functional* diseases of the nervous system. Hysteria, for example, is a neurosis; catalepsy, some forms of mental disease, such as melancholia, various forms of neuralgia and spasm, are called neuroses.

Neurot'ic, a term introduced into medicine to indicate some relationship to the nervous system. Thus a neurotic disease is a nervous disease. So medicines that affect the nervous system, as opium, strychnine, &c., are called *neurotics*.

Neusatz (noi'zäts), a town of Hungary, on the Danube, opposite Peterwardein, with which it communicates by a bridge of boats. Pop. 21,325.

Neusiedler See (noi'zēd-lēr zā), or Lake Neusiedl, a lake in the extreme west of Hungary, 23 miles long and 5 broad. It is salt and shallow throughout; greatest depth seldom exceeding 15 feet; on the east side it is lost in the great morass of Hansag. The water has several times disappeared from it entirely. The last occasion was between 1865 and 1870, when crops were grown on its bed.

Neusohl (noi'zōl), a town of Hungary, at the confluence of the Gran and the Bistritz, 79 miles north of Pesth. It is an important mining centre, copper, iron, lead, and silver being wrought. Pop. 7159.

Neuss (nois), a town in Rhenish Prussia, 21 miles north-west of Cologne, on the Erft, near its junction with the Rhine. The church of St. Quirinus (1209) is a fine Romanesque building. Neuss has various flourishing industries, including woollen and cotton machinery and metal goods, and an active trade especially in grain. Pop. 20,074.

Neustadt (noi'stât; 'new town'), the name of numerous places in Germany.—1. Neustadt-an-der-Hardt, a town in the Palatinate of Bavaria, 14 miles east of Spires, with manufactures of cloth, paper, &c. Pop. 12,255.—2. Neustadt, or Prudnik, a walled town in Prussian Silesia, 29 miles s.s.w. of Oppeln, with manufactures of damasks, table-linen, &c. Pop. 16,093.—3. Neustadt-Eberswalde, now officially named Eberswalde, a town in Prussia, 28 miles north-east of Berlin. Pop. 11,524.

Neu-Stettin, a town of Prussia, in the province of Pomerania, on a small lake, 90 miles north-east of Stettin. It was founded in 1312, and is built after the pattern of Stettin; has manufactures of machinery, &c. Pop. 8389.

Neu-Strelitz, the capital of the Grand-duchy of Mecklenburg-Strelitz, between Lakes Zierk and Glambeck, 57 miles north of Berlin. It is regularly built in the form of a star, the eight rays of which converge on a spacious market-place, and has a large and handsome ducal palace, partly in the Doric and partly in the Italian styles, with a library of 70,000 vols. and some good collections. Pop. 9366.

Neu'stria, in the geography of the middle ages, the western kingdom of the Franks, in the north of France, so called in opposition to *Austrasia* (Austria, Oestreich), the eastern kingdom of the same. The term is derived from the negative particle *ne* (not), and *Austria*. On the death of Clovis (511) his sons divided his territories into two parts, which received these names. Neustria lay between the Meuse, the Loire, and the ocean. See *France* (*History*).

Neuter, in zoology, a term applied to indicate those insect forms—represented chiefly among the ants, bees, and wasps—in which the characteristics of sex are either present in a rudimentary condition or may not be developed at all. Thus among the ants the community consists of males, females, and neuters, or 'workers' as they are also termed. These ant-neuters are simply (sexually) undeveloped females, and upon these forms the performance of all the laborious duties of the ant-colony devolves. In the bees the neuters, or workers, are similarly sterile females. The differences between the fertile females and neuters—both of which are developed from fertilized ova—appear to be produced through differences in the food upon which the respective larvæ are fed, and through similar and surrounding circumstances which affect the nutritive development of the larvæ. Plenty of food is thus said to produce females, and a scantier or different dietary males or neuters. See *Parthenogenesis*, *Ant*, *Bee*, *Wasp*.

Neuter, in grammar. See *Gender* and *Verb*.

Neutitschein (noi'tich-in), a town of Austria, in Moravia, 26 miles east of Olmütz, on the river Titsch. It lies in a fertile valley peopled by German settlers, and has manufactures of woollens, hats, &c. Pop. 10,274.

Neutra, a town in Hungary, on the river of the same name, 70 miles north-west of Budapest. Part of the town, including the cathedral and bishop's palace, is picturesquely situated on a height surrounded with ramparts and bastions. Pop. 8660.

Neutral'ity (Latin, *neuter*, neither) means, in the law of nations, that state of a nation in which it does not take part, directly or indirectly, in a war between other nations. To maintain itself in this state a nation is often obliged to assume a threatening position, to be able to repel, in case of necessity, every aggression on the part of either of the belligerents. Such neutrality is termed an *armed neutrality*. In maritime wars the treatment of effects of the enemy on board neutral vessels, or neutral effects on board a hostile vessel, gives rise to very important questions. In former times the principle was pretty generally admitted, that the ownership of the goods on board of the vessels was the only point to be considered, and not the property of the vessels themselves. The belligerents, therefore, seized merchandise belonging to the enemy on board of neutral vessels; but they restored neutral property seized under the enemy's flag. But the endless investigations which this system caused, since a consequence of it was the searching of neutral vessels, produced by degrees a new and totally contrary principle, that the flag protects the cargo.

The plenipotentiaries of Great Britain, Austria, France, Prussia, Russia, Sardinia, and Turkey, assembled at Paris in April, 1856, agreed that the neutral flag should cover an enemy's goods, with the exception of contraband of war; and that neutral goods, with the exception of contraband of war, are not liable to capture under the enemy's flag. In the arbitration (in 1872) at Geneva of the *Alabama* claims of the United States against Great Britain, three rules were agreed to by the parties, to the effect that a neutral government is bound to use due diligence to prevent the fitting out in, or departure from, any of its ports of a vessel which it has reasonable ground to believe is intended to carry on war with a power with which it is at peace; that it is bound not to permit a belligerent to make use of its ports as a basis of naval operations, or a source of recruitment of men or military supplies; that it is bound to exercise due diligence in its own ports or waters, and as to all persons within its jurisdiction, to prevent any violation of these duties and obligations.

Neutralization, in chemistry, the process by which an acid and an alkali are so combined as to disguise each other's properties or render them inert, as may be done with sulphuric acid and soda.

Neutral Salts. See *Salt.*

Neutral Tint, a pigment used in water-colours, of a dull grayish hue partaking of the character of none of the bright colours. It is prepared by mixing together blue, red, and yellow in various proportions.

Neuwied (noi'vēt), a town of Rhenish Prussia, 7 miles below Coblentz, on the right bank of the Rhine. It contains a palace, surrounded with extensive gardens, and has an establishment of the Moravian Brethren, who amount to 500 or 600 individuals, and have excellent schools, which are attended by many English pupils. Pop. 10,192.

Neva, a river of Russia, which issues from Lake Ladoga, and after a westerly course of about 40 miles flows into the Gulf of Finland below St. Petersburg, by several mouths. It is generally frozen over from October to April. Its commercial importance is enhanced by canals, which connect it with remote parts of the empire.

Neva'da, one of the United States, and part of the territory ceded by Mexico in 1848. It borders with Oregon, Idaho, Utah, Arizona, and California. The area is 110,700 square miles. It is rather mountainous, having the slopes of the Sierra Nevada in the west, and several other groups, such as the Humboldt River Mountains, Diamond Mountains, Shoshone Mountains, &c. There are several salt lakes, including Lakes Walker, Carson, and Pyramid. The chief river, besides the Colorado, is the Humboldt River. The rivers lose themselves in the soil or enter the salt lakes. Much of the state is very arid, but it includes tracts such as the charming Carson Valley, rich both in vegetation and mineral wealth. The climate is healthy, but marked by great extremes. The principal industry of the state up to this time is mining. Silver is the chief mineral product, and the mines of the Comstock Lode have been among the richest in the world. Solid masses of salt of great purity are abundantly found in many places. There are numerous mineral springs and also geysers. Only a comparatively small area is suitable for tillage, and in most of this probably irrigation will be found necessary. The Central Pacific Railway passes through the state. The capital is Carson City, but Virginia City (pop. 8511) is the largest town. Pop. in 1870, 42,491; in 1890, 45,761.

Nevada, Vernon co., Mo. Pop. 1890, 7262.

Nevers (ne-vār), France, on the right bank of the Loire, at the confluence of the Nièvre, 153 miles S.S.E. Paris. It is the see of a bishop, and has a cathedral (in part dating from the 11th century, restored 1883), a somewhat heavy building; the ducal palace, now used by the courts of justice; a hôtel de ville; &c. Nevers has important industrial establishments, including potteries and porcelain works, producing ware which has long been famed. The navy cannon-foundry, the largest ordnance foundry in France, was in 1880 turned into a practical school for boiler-making and engine-fitting. Pop. 20,935.

Neviansk', a town of Russia, in the government of Perm, about 60 miles north-west of Ekaterinburg. It is situated on the eastern slope of the Ural Mountains, in a district rich in iron and auriferous sand, and is the centre of the important ironworks in the populous valley of the Neiva. Pop. 17,950.

Neville's Cross, a cross near Durham, erected by Ralph Neville to commemorate the battle fought here between the Scottish and English forces, Oct. 17, 1346. The Scotch were totally defeated, and their king, David Bruce, was taken prisoner. The cross was destroyed in 1589.

Nev'is, a small island of the British West Indies, belonging to the Leeward group,

and lying off the south-west extremity of St. Kitts, from which it is separated by a channel 2 miles broad. It is a beautiful spot, little more than a single mountain, which rises 2500 feet from the sea, about 24 miles in circumference; area, 24,640 acres. It is of volcanic origin, is well watered and in general fertile, producing sugar, which, with molasses and rum, forms the sole export. The principal town is Charleston. Pop. 11,864.

New. For names beginning with this adjective not given here, see the articles under the name which follows it.

New Albany, a city of the United States, in Indiana, on the Ohio, which supplies abundant water-power. Steam-boat building is carried on, and there are iron-foundries, rolling-mills, woollen factories, glass-works, &c. Pop. 1890, 21,659.

Newark, Licking co., Ohio, in the midst of a fertile region, has important manuf. and flourishing trade. Pop. 1890, 14,270.

Newark, a city and port of the United States, the seat of Essex county, New Jersey, 9 miles west of New York city, finely situated on the west side of Passaic River, about 4 miles from its mouth in Newark Bay. It is the largest city in the state, and is regularly laid out with wide straight streets, generally intersecting at right angles. Broad Street, the principal thoroughfare, is more than 120 feet broad, shaded with elms, and divides the city into two nearly equal parts. Newark is distinguished as a manufacturing town, the goods including furniture, machinery and castings, leather, boots and shoes, saddlery, oil-cloth, hardware, clothing, india-rubber goods, &c.; there are also textile factories (cotton, woollen), and an extensive sewing-machine factory. There is a considerable coasting trade and constant steam-boat communication with New York. Pop. 1890, 181,830.; January, 1899, 250,000.

Newark-upon-Trent, a municipal borough of England, in Nottinghamshire, on a branch of the Trent, 17 miles north-east of Nottingham. The corn-market is one of the largest in the kingdom. Iron-founding, brass-founding, brewing, and the manufacture of boilers and agricultural implements are carried on. Newark returned two members to parliament until 1885; it now gives name to a parl. div. Pop. 1891, 14,457.

New Bedford, a city and port of the United States, Massachusetts, 55 miles south from Boston, on the estuary of the Acushnet, which opens into Buzzard's Bay. It has cotton-factories, iron and copper works, oil and candle works, shoe-factories, &c. It was at one time the centre of the American whale-fishery, but this industry has much declined. Pop. 1890, 40,733.

Newbern, a city of North Carolina, U. States, the port of entry for Pamlico district, on the estuary of the Neuse, which opens into Pamlico Sound. A large traffic in early vegetables for the northern markets is carried on. Newbern was founded by Swiss settlers in 1710. Pop. 7832.

New Brighton, a rising watering-place in Cheshire, 4 miles north of Birkenhead. It has excellent bathing. Pop. 5000.

New Brighton, Beaver co., Pa., 29 m. north of Pittsburgh. Pop. 1890, 5616.

New Brighton, a city of New York State, on Staten Island, 6 miles south-west of New York city. It contains the 'Sailor's Snug Harbour' for aged and disabled seamen of the port of New York, an institution for destitute children of seamen, and many fine residences of New York men of business. Pop. 1890, 16,423.

New Britain, the largest of a group of islands occupied by Germany, situated in what is now called the Bismarck Archipelago, east of New Guinea in Pacific Ocean.

New Britain, Hartford co., Conn., 8 m. s. w. of Hartford, manuf. extensively builders' hardware, hosiery, malleable iron, cutlery, jewelry, &c. Pop. 1890, 19,007.

New Brunswick, a province of the Dominion of Canada, on the east coast of North America; bounded west by the state of Maine; north-west by the province of Quebec; north by Chaleur Bay; east by the Gulf of St. Lawrence and Northumberland Strait, the latter separating it from Prince Edward Island; and south by the Bay of Fundy and part of Nova Scotia; area, 27,322 square miles, or about the same as the mainland of Scotland. Its coast-line is interrupted only at the point of junction with Nova Scotia, where an isthmus of not more than 14 miles in breadth connects the two territories, and separates Northumberland Strait from the Bay of Fundy, which it is proposed to unite by means of a canal. The general surface of the country is level, but hilly in the north-west. The principal rivers are the St. John, 450 miles in length, and navigable for vessels of 100 tons to Fredericton, 90 miles from its entrance into the Bay of Fundy; and the Miramichi, 225 miles in length, which falls

into the bay of the same name, and is navigable for large vessels 25 miles from the gulf. There are a number of lakes, the largest, Grand Lake, being 25 miles long by about 5 miles broad. Coal is plentiful, and iron-ore abundant; the former is said to extend over 10,000 square miles, or above one-third of the whole area. Copper, manganese, gypsum, limestone, and freestone abound. The climate, like that of other portions of Canada, is subject to extremes of heat and cold, but is, on the whole, healthy. After agriculture, lumbering and fishing are the main occupations of the inhabitants, though many are engaged in mining and manufacturing. A very large portion of the soil is well adapted for agriculture, but only about one-tenth of the land suitable for agriculture has yet been taken up. Great attention has of late years been paid to the improvement of live stock. New Brunswick is one of the most amply wooded countries in the world, and the forests supply three-fourths of the total exports, which in 1891 amounted to £950,000. The fisheries are very valuable. The minerals exported include coal, gypsum, antimony ore, copper ore, manganese, plumbago, and unwrought stone. Owing to its cheap coal and proximity to the markets of the world, New Brunswick is expected to develop as a manufacturing country, especially now that the railway system has been completed throughout the interior of the province. The affairs of the province are administered by a lieutenant-governor, aided by an executive council consisting of nine members, a legislative council of eighteen members appointed for life, and a house of assembly of forty-one representatives of the people. The province has ten seats in the Dominion Senate and sixteen in the House of Commons. Religion is abundantly provided for, as is education, both high and elementary. The latter is free, but not compulsory. The province is divided into fifteen counties. Discovered by Sebastian Cabot (1498), it formed, with Nova Scotia, the French colony of Acadia (1604–1713), was erected into a separate province in 1784, and in 1867 became a province of the Dominion of Canada. The capital is Fredericton, but the chief commercial centre is St. John, which has one of the finest harbours on the North Atlantic. Pop. in 1881, 321,233; in 1891, 321,294.

New Brunswick, a city of the United States, in New Jersey, on the Raritan, which here becomes navigable, 29 miles south-west of New York. The Dutch Reformed Church has here Rutger's College and a theological seminary. There are manufactures of india-rubber goods, paper-hangings, machinery, &c. Pop. 1890, 18,603.

New'burg, a city of New York state, occupying a commanding position on the west bank of the Hudson River, 60 miles north of New York city. It has a large river trade, especially in coal and timber. Here is the theological seminary of the Associate Reformed Church. Here also is Hasbrouck House, Washington's head-quarters in 1782–83. Pop. 1890, 23,087.

New'bury, a municipal borough in Berkshire, England, 52 miles west of London, on the Kennet, which is made navigable to Reading, and joins the Thames. There are maltings and corn-mills, and a considerable traffic carried on by the Kennet and Avon Canal. During the Civil War two battles were fought in the vicinity, both resulting in victory for the Royalists. Pop. 10,144.

New'buryport, a city and port of the United States, Massachusetts, about 3 miles above the mouth of the Merrimac. It contains the University of Modern Languages, and has cotton-mills, shoe-factories, and ship-building yards. Pop. 1890, 13,947.

New Caledonia, an island in the Pacific, situated about 800 miles east of Australia. It was discovered by Captain Cook in 1774, and appropriated by the French as a convict settlement in 1854. Their capital is Noumea, near the south end of the island, with a fine harbour. The island is mountainous, well watered and wooded, and yields all sorts of Polynesian produce. The climate is hot but healthy. There are nickel-mines, and also mines of copper and cobalt, considerable quantities of which are raised and exported, as also chrome, copra, coffee, &c. With the adjacent Loyalty Islands the area is estimated at 6724 square miles, and the population at 60,703. Including settlers and miners, officials and troops, and convicts and their families, the white population numbers about 16,000. The native population, of Melanasian race, and cannibals, have diminished greatly since the French occupation. The attempt of the French to work the settlement both as a free and as a penal colony has not hitherto answered well; and the frequent escape of convicts to Australia has been a source of trouble and international dispute.

New'castle, the principal shipping port of New South Wales after Sydney, situated at

the mouth of the Hunter River, about 75 miles north-east from Sydney, on ground rising somewhat steeply from the sea. It is a well-laid-out, well-built, and progressive town.

New Castle, Lawrence co., Pa., a thriving city, noted for the beauty of its finely shaded streets, with excellent R. R. connections, the centre of supplies for a wealthy agricultural region. Pop. 1890, 11,600.

Newcastle-under-Lyme, a municipal and parliamentary borough of England, Staffordshire, close to the Potteries, and 19 miles N.N.W. of the town of Stafford. Coal and iron works are carried on in the neighbourhood, giving employment to a large number of the inhabitants, most of whom, however, find work in the Potteries. In the town itself a few industries are carried on, such as brewing, malting, tanning, and paper-making. By canal it is connected with the Trent, Mersey, Severn, and Thames. It returns one member to parliament; it returned two until 1885. Pop. of municipal borough, 18,452; of parliamentary borough, 49,293.

Newcastle-upon-Tyne, a municipal and parliamentary borough, river-port, and (since 1882) an episcopal city, in the county of Northumberland, but forming a county in itself. It stands on the north bank of the Tyne, about 9 miles from its mouth, and 276 miles by railway from London. Among the public buildings are the Cathedral of St. Nicholas, an ancient Gothic structure (restored by Sir G. Scott, 1873–76); the Roman Catholic Church and Cathedral of St. Mary, a modern building in the early English style; the town-hall, a handsome modern edifice; the Moot Hall, in which the assizes for the county are held; the castle, one of the finest specimens of castellated Norman in England, recently restored; the Central Railway-station, an imposing building; the public library (opened 1882); and the General Market. There is a series of fine bridges across the Tyne to Gateshead; one of these, the famous High Level Bridge of Robert Stephenson, has an extreme length of 1375 feet, the upper part being 112 feet above high-water. The school system, both for elementary and secondary pupils, is excellent. Among the educational institutions the chief are the College of Medicine and Surgery; and the College of Physical Science, in connection with Durham University. Newcastle, owing to the rich mineral products of the neighbourhood, has attained a first position among the great centres of British enterprise. Some of the more important of its industries are shipbuilding, and the manufacture of locomotive and marine engines, cannon, shot, tools, firebricks, hemp and wire ropes, cables, anchors, sails. Situated in the midst of one of the largest coal-fields in England, it exports immense quantities of coal. Newcastle is one of the Tyne ports (which include also North and South Shields). During the past few years vast improvements have been made on the river, and all the way between Shields and Newcastle there is now a depth of 20 feet at low water. (See *Tyne.*) Newcastle is situated at the eastern termination of the wall of Hadrian, and Roman antiquities have been repeatedly discovered in it. The castle or fortress was built by Robert, son of William the Conqueror, about 1080, about which time it received its present name. Newcastle was a frequent object of attack in the wars between England and Scotland. It was taken possession of by the Scottish Covenanting army in 1640 and in 1644, and in 1647 Charles I. was delivered here by the Scottish army to the parliamentary commissioners. Newcastle returns two members to the House of Commons. Pop. 1891, 186,345.

Newchwang, a city of China, in Manchuria, on the Liau-ho River, about 35 miles from its mouth. It is practically an inland city, but was chosen as one of the ports to be opened to foreign commerce by the Treaty of Tien-tsin. The foreign settlements and the trade, however, are necessarily at Ying-tze, near the river's mouth.

New College, one of the colleges of Oxford University, founded in 1379 by William of Wykeham, bishop of Winchester and lord-chancellor of England.

New'comen, THOMAS, a locksmith at Dartmouth, in Devonshire, towards the close of the 17th century, and one of the inventors of the steam-engine. Newcomen conceived the idea of producing a vacuum below the piston of a steam-engine after it had been raised by the expansive force of the steam, which he effected by the injection of cold water to condense the vapour. The merit of first applying the steam-engine to practical purposes is thus due to Newcomen, who, in conjunction with Captain Savery and John Cowley, took out a patent for the invention in 1705. See *Steam-engine.*

Newdigate Prize, a prize in Oxford University, annually awarded for an English

poem. It was founded by Sir Roger Newdigate, Bart. (1719–1806), who left liberal bequests.

Newel, the central space or column round which the steps of a circular staircase are wound. When there is no central pillar the newel is said to be open.

New England, the north-east portion of the United States, comprising the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut. Originally called North Virginia when granted by James I. to the Plymouth Company in 1606, it received the name of New England from Captain John Smith, who explored and made a map of the coast in 1614.

New Forest, a large tract in England, in the south-west of Hampshire, forming one of the royal forests, about 60 miles in circuit, which is commonly said to have been laid waste and turned into a forest by William the Conqueror. It contains within its limits portions of cultivated land belonging to private persons. The public portions are partly inclosed, partly uninclosed, and present much fine sylvan scenery. There are several villages within the forest area, Lyndhurst being the forest capital. Oak and beech are the principal trees. It now gives name to a parl. div. of Hants.

New'foundland, a large island of British North America, in the Atlantic Ocean, at the mouth of the Gulf of St. Lawrence, and nearer to Britain than any other part of America—the distance from the port of St. John's to the harbour of Valentia, in Ireland, being only about 1918 miles. Area, excluding the territory of Labrador on the mainland, which belongs to this colony, 40,000 square miles (or nearly 10,000 more than Ireland). It is of extremely irregular form, with a coast-line, particularly on the south-east and south, broken up in a remarkable manner by broad and deep bays, harbours, coves, inlets, and lagoons. The interior is much intersected by rivers and lakes, exhibits many barren tracts, and is but thinly wooded except on the banks of the rivers; nevertheless there is much more land suited for settlement than was once supposed, and the forests as a whole are valuable. The largest rivers are Humber River and the river Exploits; the largest lakes Grand Pond and Indian Lake. The minerals comprise coal, gypsum, copper, lead, nickel, silver, iron, and gold. Copper exists in large quantities, and is worked to a greater extent every year. The winter is long, severe, and damp, and the summer is dry, short, and hot; but the climate, though severe, is healthful, the mortality among the inhabitants being lower than in most parts of the American continent. The principal trees are pine, spruce, birch, willow, and mountain-ash. The crops generally are abundant, particularly potatoes. Grain crops also thrive well in parts, wheat having been known to yield 50 bushels per acre; but both climate and soil are more favourable to pasturage and green crops than to grain. Dairy farming is being introduced, and agriculture is sure to receive more attention in the future. In the valleys on the western coast are large tracts, now almost wholly unoccupied, capable of being converted into fairly productive grazing and arable land, but waiting for the construction of railways. The south-eastern portion is the most thickly settled. The wild animals are the caribou or reindeer, bear, wolf, hare, beaver, marten, wild cat, &c. The famous banks of Newfoundland around the coasts swarm with almost every variety of fish, particularly cod. The cod-fishery is prosecuted from June to November, and may be said, with the other fisheries, of seal, lobster, herring, and salmon, to form the staple occupation of the inhabitants. The produce has reached $7,500,000 in the year. The exports, 1891, amounted to $7,437,158; the imports, $6,869,458. Cod-fish is far the largest export. The trade is chiefly with Britain, Canada, and the U. States. The currency is dollars reckoned at 4*s*. The affairs of the colony are administered by a governor, appointed by the crown; an executive council composed of the governor and six responsible ministers; a legislative council of fifteen members, nominated by the governor; and a house of assembly of thirty-six members, elected by manhood suffrage (according to act of 1889). Religion is chiefly divided between the Roman Catholic, Anglican, and Wesleyan bodies. Education is denominational. The original Atlantic cable lands in Heart's Content Harbour. Newfoundland was discovered by John Cabot in 1497, and the first English colony was planted in 1621. A struggle for supremacy took place between the English and the French; but in 1713 Newfoundland and its dependencies were declared, by the Treaty of Utrecht, to belong wholly to Great Britain, the French reserving a right to fish and cure on certain parts of the coast. Responsible government was granted in 1833.

The colony, as yet, declines to join the Canadian Confederation. The only noteworthy town on the island is St. John's, the capital. Pop. 1891, 197,934.

Newgate, the celebrated jail of the city of London, at the west end of Newgate Street, mentioned as a prison early in the 13th century. In the 15th century Sir Richard Whittington in his will left funds to rebuild it; it was rebuilt a second time after the great fire of 1666, and a third time after the No Popery Riots of 1780.

New Granada. See *Colombia.*

New Guinea, or PAPUA, a large island in Australasia, next to Australia the largest on the globe; area, 305,900 square miles; length about 1500, breadth from 200 to 400 miles. It is separated from Australia on the south by Torres Strait, and from the Moluccas on the west by Gilolo Passage. The coasts are for the most part lofty, with mountains coming close to the sea, but in the neighbourhood of Torres Strait the shore presents the appearance of a marshy flat covered with dense forests. In the interior there are still loftier mountains, covered with perpetual snow, and volcanoes. In the south-east end Mount Owen Stanley rises to the height of 13,205 feet; farther west and near the north coast Mount Schopenhauer reaches 20,000 feet. The island is rich in tropical products, possesses a copious and peculiar flora and fauna (birds of paradise being especially numerous and gorgeous), and is suitable for tropical agriculture. The coast is miasmatic in many places; the mountainous interior is reported healthier. On the west coast there are numerous Malay settlements, but the bulk of the inhabitants are Papuas, a race resembling the negroes of Guinea. Some are disposed to be friendly, others are fierce and intractable. The discovery of New Guinea was made by the Portuguese early in the 16th century, but little was known of it till recently. The naturalists were the first to make incursions into its interior, and among these Mr. A. R. Wallace, who visited it in 1858, was the pioneer. The missionaries came next, and mission stations have been formed by Germans on the north-east coast, and by the London Missionary Society at various points on the south-east coast. Germany and the Australian colonies also began to take an interest in New Guinea, and the latter urged the home government to annex the eastern part of the island, the western portion having long been recognized as Dutch. At length the delimitation and division of the island between Great Britain, Germany, and Holland was settled in 1885. That part of the island lying west of the 141st meridian is assigned to Holland, and comprises 150,755 square miles; the northern part of the rest of the island is assigned to Germany, and the southern to Great Britain. The German territory, called Kaiser Wilhelm's Land, contains 68,785 sq. miles, the English territory 86,457 square miles, estimated pop. 135,000.

Natives of New Guinea.

The government of the British portion is in the hands of an administrator appointed by the crown, assisted by an executive and a legislative council. New South Wales, Victoria, and Queensland each contribute to the expense of the government. Land cannot be purchased except from the administrator. The deportation of the natives is forbidden, as is also the sale to them of firearms, intoxicating spirits, or opium. The official centre is Port Moresby. The islands of Torres Strait, which are the seat of a valuable pearl-shell and trepang fishery, and which practically command the strait, have all been annexed to Queensland. A German chartered company whose object is to develop the resources of the country has stations in German New Guinea, where also the sale of firearms, gunpowder, and spirits is forbidden. The Dutch have done little or nothing for their portion of the island. Estimates of the total population vary between 500,000 and 2,500,000.

New Hampshire, one of the United States, bounded on the north by Canada, east by Maine, south-east by the Atlantic, south by Massachusetts, and west by Vermont, from which it is separated by the river Connecticut; area, 9305 square miles. This state has a sea-coast of only 18 miles. For the distance of 20 or 30 miles from the

sea the land is almost level, but thereafter rises, and in its northern part is traversed south-west to north-east by a continuation of the Alleghanies, culminating in Mount Washington, 6285 feet high. The principal crops are wheat, Indian corn, oats, and barley; buckwheat, hay, hops, tobacco, potatoes, flax, beans, and pease are also raised. Apple and pear trees are abundant in the cultivated districts; and the hilly and mountainous regions are still covered with extensive forests of pine, oak, beech, birch, sugar-maple, &c. Manufactures are actively carried on, the principal being cotton, woollen, and worsted goods, boots and shoes, leather, lumber, iron, machinery, furniture, &c. The mileage of railways is greater in proportion to population and wealth than in any other New England state. Education is well attended to. There is but one university, Dartmouth College, Hanover. New Hampshire was first settled in 1623 at Dover and Portsmouth. The capital is Concord, the largest city and the chief manufacturing centre is Manchester, and the only port is Portsmouth. Pop. 1890, 376,530.

New Haven, a seaport town, United States, Connecticut, on a bay of same name in Long Island Sound, 72 miles north-east of New York. There are important manufactures of carriages, arms, wire, &c., and there is a large foreign trade, particularly with the West Indies. New Haven is widely known as the seat of Yale College (which see). Pop. 1890, 81,298.

New Hebrides, a long chain of volcanic islands in the Pacific, lying north-west of Fiji and north-east of New Caledonia, and embracing an area of about 3000 square miles. They are extremely fertile, producing cocoa-nuts, sandal-wood, fruits, and all manner of Polynesian produce; but the climate is rather unfavourable to Europeans. The natives are of Melanesian race. The New Hebrides have for some time been more or less a source of international difficulty between Britain and France. An agreement was at length come to that neither power should annex the group; but in 1886, apparently in violation of this agreement, French troops were landed on various pretexts, and military stations formed at various points. They eventually evacuated the islands, and a dual protectorate has been formed.

New Holland. See *Australia.*

New Inn. See *Inns of Court.*

New Ireland, the name of the largest of a group of islands situated east of New Guinea, in the Bismarck Archipelago, in the Pacific Ocean. The inhabitants are cannibal Papuans; the islands are volcanic, and the soil good. Called by the Germans *Neu-Mecklenburg.*

New Jersey, one of the eastern United States, bounded on the north by New York, east by the Atlantic Ocean and the Hudson River, south by Delaware Bay, and west by the states of Delaware and Pennsylvania, from which it is separated by the Delaware River; area, 7815 square miles. The bays of Newark, Raritan, and Delaware form excellent harbours. The north-west part of the state is mountainous, being crossed by two ranges of the Appalachian chain. The middle portion of the state is agreeably diversified by hills and valleys; the southern part is level and sandy, and to a great extent barren, yielding naturally little else than shrub-oaks and yellow pine. The other portions of the state have a good soil, and produce Indian corn and other cereals, buckwheat, potatoes, &c. The fruits are good, especially apples, pears, cherries, plums, and peaches. The climate is mild, and nowhere is the cold severely felt in winter except in the mountainous regions of the north, where the finest cattle are reared, and large quantities of butter and cheese made. New Jersey ranks high among the states in manufacturing and chemical industries, while in some industries, as silk, pottery, and glass, it stands first, although it is only eighteenth in population and forty-first in area. It is rich in metals, especially iron and zinc. The principal seat of education is the New Jersey College, Princeton, one of the principal colleges in the United States. There is a state normal school at Trenton. The principal towns are Trenton, the capital; Jersey City, Newark, New Brunswick, Paterson, and Burlington. New Jersey was first settled by the Dutch from New York, 1614–20. It was one of the thirteen original states of the Union. Pop. 1,444,933.

New Jerusalem Church. See *Swedenborgians.*

New Leon, or NUEVO LEON, a Mexican state, bounded by Cohahuila, Zacatecas, San Luis Potosi, and Tamaulipas; area, 23,637 square miles. It is mountainous but fertile, and lead, gold, silver, and salt are worked; chief town, Monterey. Pop. 1890, 270,852.

New London, a city of the United States, in Connecticut, on the Thames, 3 miles from its entrance into Long Island Sound, 42 miles E.N.E. of New Haven. The seal, cod,

and mackerel fisheries employ many of the inhabitants. New London is a fashionable summer resort. Pop. 1890, 13,757.

Newman, Francis William, younger brother of Cardinal Newman, was born in London 1805, and was educated at Ealing and at Worcester College, Oxford, graduating double first (1826). He was fellow of Balliol 1826–30, when he resigned, having conscientious scruples about signing the Thirty-nine Articles. He was appointed classical tutor at Bristol College (1834), professor of classics at Manchester New College (1840), and professor of Latin at University College, London, 1846–63, since which time he has devoted himself exclusively to literature. His writings exhibit great scholarship and versatility. Among them are The Soul, its Sorrows and Aspirations (1849), Phases of Faith (1850), and Theism (1858). Like his brother, Cardinal Newman, he has diverged widely from Anglican orthodoxy, but in precisely the opposite direction.

Newman, John Henry, Cardinal, born at London 1801, and educated at Ealing and Trinity College, Oxford, where he graduated with classical honours (1820), and was elected fellow of Oriel College. He was vice-principal of St. Alban's Hall (1825–26) under Dr. (afterwards Archbishop) Whately, and was incumbent of St. Mary's, Oxford, and chaplain of Littlemore (1828–43). During this last period he took part with Keble and Pusey in originating the Oxford movement; was a leader in the propaganda of High Church doctrines, and contributed largely to the celebrated Tracts for the Times. The last of these, on the elasticity of the Thirty-nine Articles, was censured by the University authorities, and was followed by Newman's resignation of his livings (1843), and secession to the Church of Rome (1845). Ordained a priest of that church, he was successively head of the Oratory of St. Philip Neri at Birmingham, rector of the Roman Catholic University of Dublin (1854–58), and principal of the Roman Catholic School at Edgbaston. In 1879 he was created a cardinal. He has written some remarkable works sustaining the doctrines of the Church of Rome, particularly the Apologia pro Vitâ suâ (1864), and the Reply to Mr. Gladstone (1875) on the Vatican Decrees. Died in 1890.

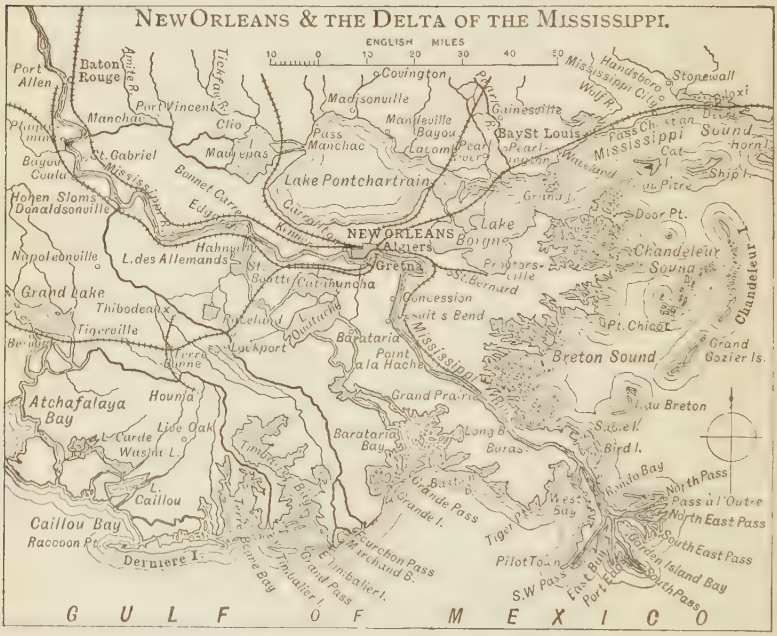
Newmarket, a town of England, partly in Cambridgeshire and partly in Suffolk, 13 miles E.N.E. of Cambridge; the chief seat of the Jockey Club, famed for its race-course, races, and horse-training establishments. The chief races are the Two Thousand, run in April, and the Cesarewitch, run in October. Pop. 5447.

New Mexico, one of the territories of the United States, bounded on the north by Colorado, east by Texas, south by Texas and Mexico, and west by the territory of Arizona; area, 122,580 square miles. The surface is generally mountainous, being traversed from north to south by the Rocky Mountains. A central valley extends across the whole territory from north to south, with an average breadth of 20 miles, traversed by the Rio-Grande, and hemmed in either by the main chain or by ramifications of the Rocky Mountains. To the south of the town of Santa Fé they average from 6000 to 8000 feet high, but in the vicinity of the town and north of it some snowy peaks rise to the height of 10,000 or 12,000 feet. The higher ranges are covered in many places with pine forests, and the lower with cedars and occasional oaks. The climate is generally temperate and salubrious. The soil is often sandy, but an extensive system of irrigation canals is projected; as it is, about half the surface consists of good average agricultural land, producing abundant crops of Indian corn, wheat, and pulse. Fruits are abundant, and the vine is largely cultivated. Considerable attention is paid to the rearing of cattle. There are enormous deposits of coal; and iron, lead, zinc, copper, silver, and gold are found in important quantities. New Mexico was ceded to the United States by Mexico in 1848. In 1850 it was erected into a territory of much greater area than at present. The territory of Arizona was cut off from it in 1863, and another portion of it transferred to Colorado in 1865. A large number of the inhabitants are of Mexican origin. Pop. 153,593.

Newnham College, an English college for the higher education of women at Cambridge, founded in 1871, and incorporated in 1880. Women are not admitted under eighteen years of age, and the course of study corresponds with that of Cambridge University, the female student being expected to prepare for a Tripos examination. There are a certain number of exhibitions and scholarships connected with the college, which is quite on the same lines as Girton.

New Orleans, a city and port of the United States, Louisiana, chiefly on the left bank of the Mississippi, 115 miles above its mouth. The alluvial flat on which it

stands is a mere swamp, and the town is only saved from the inundations of the river by a strong *levee* or embankment, built along the city front, and 200 miles above and 50 miles below, extending also around the city in the rear. The nucleus of the town is built around a bend of the river, from which it derives its popular sobriquet 'the Crescent City.' The streets in this portion are mostly narrow, but many of those in the suburbs are spacious and handsome, and lined with shade-trees. The public buildings are neither numerous nor remarkable, and the manufactures are inconsiderable. New Orleans is simply the outlet for the produce of the countries drained by the Mississippi—sugar, molasses, rice, tobacco, Indian corn, wheat, oats, flour, and above all, cotton.



Ships of the largest size can now reach the city docks. The yellow fever has often caused great mortality during the summer months; but these epidemics have been greatly mitigated by the adoption of sanitary measures and drainage on a grand scale. New Orleans was founded by the French in 1717, and finally passed with Louisiana to the United States in 1803. Pop. 99, 300,000.

New Platonists, a philosophical sect, so called because they founded their speculations on those of Plato; also called the *Alexandrian Platonists*, because their chief seat was at first in Alexandria. Their doctrines (Neoplatonism) had a tendency to unite Platonic ideas with Oriental mysticism, and borrowed elements from various schools. Ammonius Saccas of Alexandria was the founder of the school, and among his pupils were Longinus, Plotinus, and Origen, Plotinus (born A.D. 205, died 270) being the chief and the one who contributed chiefly to settle the doctrines of New Platonism. Philosophy, according to him, should know the One which is the cause and essence of all things, the original or primitive light from which everything emanates, not by thought and reflection, but in a perfect manner by intuition, which precedes thought. Intelligence, the product and image of the One, penetrates all things; and the soul proceeds from it, as the forming thought; the soul again seeks the One, the Good, the original cause of the universe.

The whole spiritual world is to be considered as one spiritual being. The sensible world is but the image of the intelligible world; time is an image of eternity, and emanates from it. Evil is either only apparent or necessary; but if necessary, it ceases to be evil. The god of Plotinus is a mystical Trinity, consisting of three Hypostases or Substances. Among the pupils of Plotinus Porphyry and Iamblichus were the most distinguished. Athens latterly became the seat of New Platonism, among the later New Platonists being Proclus of Constantinople.

New Plym'outh, a town of New Zealand, in the North Island, capital of the province of Taranaki, beautifully situated on the west coast, 120 miles from Auckland. Pop. 4000.

Newport, a municipal borough of England, in the Isle of Wight, on the Medina, which is navigable for small craft. About a mile from the town are the ruins of Carisbrooke Castle. Newport sent two members to parliament from the reign of Elizabeth till 1867, and one member from 1867 till 1885. Pop. 1891, 10,216.

Newport, a seaport, municipal and parliamentary borough of England, in Monmouthshire, on the river Usk, 12 miles north-east of Cardiff by rail. The docks are spacious, and capable of admitting vessels of any dimensions and burden at all states of the tides. The great trade of the place is the export of manufactured iron. Ship-building is carried on to some extent. There are also iron-foundries, sail-lofts, anchor and chain-cable works, &c. Newport unites with Monmouth and Usk in sending a member to parliament. Pop. 1891, 54,695.

Newport, a flourishing city of the United States, in Kentucky, on the river Ohio, opposite Cincinnati, of which it is practically a residential suburb. Its chief manufactures are in iron and steel. Pop. 24,918.

Newport, a seaport of the United States, one of the capitals of Rhode Island, and capital of Newport co., at the main entrance of Narraganset Bay, 25 miles south by east of Providence, a most fashionable watering-place. For over 250 years it has been the annual meeting-place of the Society of Friends. Pop. 1890, 19,457.

Newport News, a rising American seaport in Warwick county, Virginia, near the extremity of the peninsula formed by the York and James Rivers. Newport News exports cotton, lumber, wheat and flour, tobacco, &c., and is expected to become a great maritime city. Pop. 4449.

New Providence. See *Bahama Islands.*

New Red Sandstone, the lowest group of secondary rocks, lying between the Permian below and the Lias above. See *Geology.*

New Ross, a river port of Ireland, on the Barrow, 2 miles below its juncture with the Nore, situated partly in Kilkenny but principally in Wexford county, 84 miles S.S.W. of Dublin.

New Rochelle, Westchester co., N. Y., on Long Island Sound, has several factories. Pop. 1890, 8217.

Newry, a parliamentary borough of Ireland, partly in co. Down, partly in Armagh, finely situated on the Newry, 5 miles from where it enters Carlingford Bay, 32 miles S.S.W. of Belfast. It is a handsome well-built town, and has flour-mills and large spinning-mills. Newry exports large quantities of cattle and agricultural produce to Liverpool and Glasgow. Vessels drawing 15 feet of water can reach the Albert Basin by a canal, and there is canal communication with Lough Neagh. Newry returns a member to parliament. Pop. 1891, 13,211.

New Shetland, a group of islands almost destitute of vegetation, in the Antarctic Ocean, about 600 miles S.E. of Cape Horn. They were discovered in 1819, and are sometimes frequented by whalers.

New Siberia, a group of uninhabited islands in the Arctic Ocean, off the north coast of Siberia; area estimated at 20,000 square miles. The islands produce neither bush nor tree, but the soil contains much fossil wealth in the shape of the bones and teeth of the mammoth, rhinoceros, &c.

New South Wales, a colony of Great Britain, which at one time comprised the eastern half of Australia, but is now bounded by Queensland on the N., Victoria on the S., the Pacific Ocean on the E., and South Australia on the W.; area, 323,437 square miles. A mountain range (the Great Dividing Chain) extends from north to south nearly parallel to the coast, at the distance of from 30 to 50 miles inland. The highest summits are Mount Kosciusko, Mount Clarke, and Mount Townshend in the south-east (7353 feet), the last being the highest mountain in the colony and in Australia. The coast-line presents in general bold perpendicular cliffs of sandstone in horizontal strata. Among the indentations of the coast may be mentioned Port Stephens, Port Hunter, Broken Bay, Port Jackson, Botany Bay,

Jervis Bay, Sussex Haven, and Twofold Bay. The most important rivers are on the west side of the great watershed, the chief being the Murray, the Murrumbidgee, the Lachlan, and the Darling, the Murray receiving the waters of the others and carrying them to the sea through S. Australia. The Murray partly belongs also to Victoria, as it forms the boundary between New South Wales and that colony, and the Darling is thus the chief river of N. S. Wales. On the east side of the watershed are no large rivers, the chief being the Hunter (300 miles) and the Hawkesbury (330 miles). The volume of the rivers depends greatly on the season, and their utility for inland navigation is much impaired by their shallowness. As a general rule the prevailing rock on the east side of the mountains is sandstone, and on the west granite. Much of the sandstone belongs to the Carboniferous system, and is accompanied with workable seams of excellent coal. The coal-fields extend over an area of 10,000,000 acres, with an output (1891) of 4,037,929 tons. Copper-ore of the richest quality has been found in great abundance, but is not yet extensively worked. Tin exists in large quantities, and iron is very generally distributed. But the chief mineral product of the colony has been gold, the total value of which hitherto obtained was to year 1892 £38,633,488. Silver and lead have also been found. As the area of the colony extends over eleven degrees of latitude, and as it contains a good deal of elevated ground, nearly every variety of climate is to be found. The interior plains are very dry, while the coast districts have abundant rains. The winters are mild; and though the hot winds of the warm season are annoying, they are not unhealthy, while storms and electrical disturbances are comparatively rare. The scarcity of water renders much of the surface far better adapted for pasturage than for agricultural purposes, though where the necessary moisture is present heavy crops are obtained. The agricultural land is chiefly under wheat and maize, oats and barley, and there is also a considerable area under sugar, vines, fruit-trees, &c. Fruits and vegetables in great variety are grown. But the rearing of sheep and cattle are the chief employments of the people, and wool is the most important article of export. There are about 40,000,000 sheep in the colony. The exports, 1891, £25,944,020; imports, £25,383,397, about half being wool. Some other exports are gold coin, tin, sheep and cattle, tallow, coal, copper, &c. The imports are wearing apparel, iron goods and hardware, wine, spirits, and beer, sugar and tea, &c. The manufacturing industries of the colony are naturally not of much importance as yet, but they are increasing; and the industrial works embrace tanneries, woollen factories, soap and candle works, breweries, steam sawmills, shipyards, foundries, machine-works, clothing factories, &c. There were (1892) 2185 miles of railway open, besides what is in course of construction; the telegraphic wires extend over 24,750 miles. The constitution of New South Wales vests the legislative power in a parliament of two houses, the Legislative Council namely, and the Legislative Assembly. The former consists of not fewer than 21 (at present of 58) members nominated by the crown for life; and the latter of 122 members chosen triennially by 72 constituencies on a basis of manhood suffrage. The executive consists of a governor nominated by the crown, assisted by a council composed of colonial secretary, colonial treasurer, the ministers for lands, public works, justice, and other high functionaries. The revenue for 1890 was £9,329,000, the expenditure £9,264,000; estimates for 1891 £10,036,185 and £10,478,673 respectively; public debt £50,995,433. Sydney is the capital; other towns are Newcastle, Bathurst, Goulburn, Paramatta, Maitland. There is no established religion. Among the religious sects the Church of England, Roman Catholics, Wesleyan Methodists, and Presbyterians hold the chief place. Primary education is compulsory (but not quite free) between the ages of 14 and 16. The educational system comprises lower and higher public schools, evening schools, &c., at the top being the University of Sydney. With it are affiliated three theological colleges, for Church of England, Presbyterian, and R. Catholic students respectively. The colony has taken measures for its own defence, and has a force, partly paid partly volunteer, numbering more than 6000, and including infantry, cavalry, artillery, engineers, naval brigade, &c.—New South Wales was discovered by Captain Cook in 1770, and founded as a penal settlement (at Botany Bay) in 1788. One of its early governors was the notorious Captain Bligh, who was deposed by the colonists in 1808. The most important events in its history since convict immigration ceased in 1840 are the establishment of representative institutions in

1843; the erection of Victoria into a separate colony in 1850; the important discovery in May, 1851, of extensive auriferous tracts and the rush to the gold diggings, with consequent great increase in population and prosperity. The first railway, from Sydney to Paramatta, was opened in 1855. Amongst more recent events are the Sydney Exhibition held in 1879, and the Intercolonial Conference held at Sydney in 1883. A bill to change the name of the colony to Australia was introduced in 1887. New South Wales has not yet seen her way to take advantage of the Federal Council Act of Australasia, passed by the imperial parliament in 1885. (See *Australia.*) The colony celebrated its centenary in January, 1888, and a special series of stamps of elaborate design was issued in commemoration of the event. Pop. in 1888, 1,085,740; in 1891, 1,132,234.

Newspapers. Although something like an official newspaper or government gazette existed in ancient Rome, and Venice in the middle of the 16th century had also official news sheets, the first regular newspaper was published at Frankfort in 1615. In England no genuine newspaper of the 16th century has been preserved, and it is not till 1622 that we find The Weekly News from Italy, Germany, &c., which may be regarded as the first specimen of the regular newspaper that appeared in England. Other journals followed, and one of these, published in November, 1641, under the title of Diurnal Occurrences, or the Heads of Several Proceedings in both Houses of Parliament, is noticeable as the first which furnished a report of the proceedings in parliament. The oldest existing newspaper in England is the government paper the London Gazette, the first number of which was issued on the 7th of November, 1665, at Oxford, whither the court had retired in consequence of the plague then raging in London. It has since been uninterruptedly published twice a week for more than two centuries. The first London daily paper was published in 1709 under the name of the Daily Courant. Among the journals of the last century may be noticed more especially the Public Advertiser, which first appeared in 1726, and became afterwards so celebrated by the publication in it of the famous Letters of Junius. The Morning Chronicle appeared in 1769, and the Morning Post in 1772. The latter is still flourishing, the former lasted over ninety years. The Times was first commenced on 18th January, 1785, under the name of the London Daily Universal Register, which was afterwards superseded by that of the Times on 1st January, 1788. From the establishment of the Times scarcely any attempt to start a daily paper in London for a long time succeeded, with the exception of the Morning Advertiser (1794). The leading daily morning papers at present are the Daily News (1846), Daily Telegraph (1855), and the Standard (1857). The Daily Telegraph and the Standard have enormous circulations. The Globe, dating from 1803, is the oldest evening newspaper now existing; others are the Evening Standard, St. James's Gazette, Evening News, Pall Mall Gazette, and Echo. The Observer, Spectator, Saturday Review, &c., are among the chief of the weekly newspapers, but as regards circulation Lloyd's Weekly Newspaper and Reynold's Weekly Newspaper are at the top. The Athenæum and Academy are purely literary; pictorial merits are the distinguishing features of the Illustrated London News and the Graphic (the latter now issues a Daily Graphic); and the so-called 'society' papers are represented by the World and Truth.

One of the earliest English local papers was the Norwich Postman, published in 1706 at the charge of a penny, but 'a halfpenny not refused;' and followed by the Norwich Courant in 1714, and the Weekly Mercury, or Protestant's Packet (also at Norwich, and still in existence), in 1720. The Worcester Postman appeared in 1708, the Newcastle Courant in 1711, the Kentish Post (now the Kentish Gazette) in 1717, and the Leeds Mercury in 1718. The first newspaper printed in Scotland was the Mercurius Politicus, issued in 1653. The Mercurius Caledonius had a three-months' existence in 1661; the Edinburgh Gazette appeared in 1699, the Courant in 1705, the Caledonian Mercury in 1720, and the existing Scotsman in 1817. The first paper published in Glasgow was the Glasgow Courant, in 1715, followed by the Glasgow Journal in 1729; the existing Glasgow Herald dates from 1782. The first newspaper actually published in Ireland was the Dublin News-Letter, in 1685, followed by the Dublin Intelligencer in 1690. The Belfast News-Letter and Saunders' News-Letter, both of which still exist, appeared, the former in 1737, the latter in 1754. The Freeman's Journal commenced in 1763.

The increase of rapid communication gene-

rally; the development of telegraphic communication, and the system of telegraphic news-agencies, established first by Julius Reuter in 1849; the vast improvement in printing, the repeal of the stamp-duty (originally imposed in 1712) in 1855, and of the paper-duty in 1861, and the enormous growth of advertisements, have given a great impetus to this branch of literature. Penny weekly and penny daily papers are now exceeding numerous; even halfpenny newspapers are not uncommon. Special industries and professions are now represented by organs of their own, and the number of special illustrated domestic and literary papers is enormous. The provincial press has had an extraordinary development since the middle of the century, and many of the organs in the large towns are conspicuous for enterprise and influence. There are at present over twenty daily newspapers published in London. In 1846 the total number of newspapers was only 549, of which fourteen were dailies. Since that period the number has nearly quadrupled itself, and stands at more than 2100. There are now altogether some 500 daily and other newspapers in the metropolis, about 1400 in the provinces, 80 in Wales, about 200 in Scotland, about 180 in Ireland, and 20 in the Isle of Man and the Channel Islands.

The Boston News-Letter, started in 1704, was the first regularly established American newspaper. The first daily newspaper was the American Daily Advertiser, issued in Philadelphia in 1784—now the North American. By the commencement of the revolutionary war in 1775 the number of newspapers published in the New England States amounted to thirteen. In 1891 there were published in the United States and Canada about 1800 daily and 14,284 semi-weekly and weekly newspapers. Since 1840 New York has been the acknowledged metropolis of the newspaper and periodical press of America. The most widely circulated are The New York Herald, The World, The News, The Morning Journal. The Herald was begun in 1835 by Mr. Jas. Gordon Bennett, a native of Scotland, and the enterprise shown in its management has never been exceeded in the history of the newspaper press. In 1841 the Tribune was begun by Mr. Horace Greeley, under whose management it acquired a high reputation. The New York Times was established in 1850. In Australia and New Zealand there are about 800 newspapers, and the leading papers, in size, appearance, and contents, compare favourably with the best British papers. The first paper published was the Sydney Gazette (1803–43). In the Cape Colony the press is of the same vigorous and important character; while in India, besides the great exponents of English news published in the capital, there are all over the vast empire important local papers for English-speaking readers. The first newspaper in the English language appeared in Bengal in 1780. There are upwards of 300 newspapers published in the various vernacular languages, the latter being under a certain measure of restraint (Vernacular Press Act, 1878).

The first newspaper established in France was the Gazette de France, published under the patronage of Richelieu in 1631, by Theophraste Renaudot, a physician. It continued to appear till 24th August, 1848, when it was suspended; but it was resumed and has continued to exist under various names. An immense impetus was given to the French newspaper press by the revolution, but of all the newspapers commenced at this eventful period the only ones which have survived to the present day are the Journal des Débats and the Moniteur. At present the daily press of Paris represents all shades of political opinion, and some of the papers have phenomenal circulations, but as regards the amount and value of the matter they contain they are generally far behind those of the English-speaking countries. In Germany (as already mentioned) the first regular newspaper was commenced at Frankfort in 1615, under the title of the Frankfurter Oberpostamtszeitung. By the end of the 17th century all the principal towns of Germany had their newspapers, but previous to the French revolution their circulation was inconsiderable. The first number of the Allgemeine Zeitung was published in 1798, and it soon rose to the highest position in the ranks of German journalism, a place which it still maintains. Other leading German dailies are the Kölnische Zeitung (Cologne Gazette) and the National Zeitung. The Illustrirte Zeitung is an illustrated weekly, similar to the London News and Graphic. In Austria the number of newspapers is comparatively small. Some of the newspapers of Belgium and Holland are conducted with great ability. The press of Italy, of Spain, of Sweden and Norway, and of Denmark, is, in each instance, comparatively of less importance.

The Journal de St. Petersbourg, in French, has a considerable circulation outside of Russia. Turkey and Greece are now in possession of numerous journals.

New Style. See *Calendar*.

Newt, or **Eft,** the popular name applied to various genera of amphibians included in the order Urodela ('tailed') of that class. Water-newts, or 'water-salamanders' as

Great Water-newt (*Triton cristatus*).

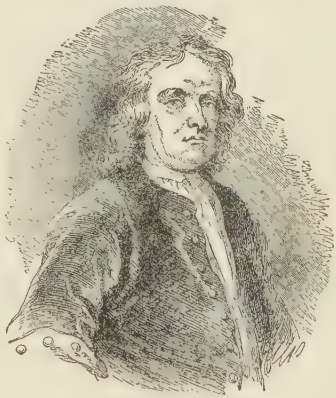
they are sometimes termed, possess a compressed tail, adapted for swimming. These forms are oviparous, and though aquatic in their habits they are yet strict air-breathers. The larval gills are cast off on maturity being reached, or about the third month of existence. The larval tail is retained throughout life. The male animals are distinguished by the possession of a crest or fleshy ridge borne on the back. The food consists chiefly of aquatic insects, larvæ, &c. The *Triton cristātus*, or great water-newt, is about 6 inches in length; the *Triton aquaticus* averages about 3 inches; and both are common in fresh-water pools and ponds in Britain. The land-newts are included under the genus *Salamandra*. The tail is of rounded or cylindrical form, and is therefore not adapted for swimming. The land-newts possess cutaneous glands which secrete a fluid of watery nature; and the popular superstition that if put on a fire these creatures were able to extinguish the flames may have taken origin from the abundant secretion of these glands. *Salamandra maculōsa* of Southern Europe is a familiar species, as also is the *S. alpīna* found inhabiting mountainous situations. These forms possess the power of reproducing lost or mutilated toes or even limbs. The newt is quite harmless.

New Testament. See *Bible*.

Newton, Harvey co., Kans. Pop. 5605.

Newton, a city of the United States, in Middlesex county, Massachusetts, on the Charles River, 8 miles W. of Boston, a favourite residence of Boston merchants. It is the seat of the Newton Theological Institution (Baptist). Pop. 1890, 24,379.

Newton, Sir Isaac, the most distinguished mathematician of modern times, was born at Woolsthorpe, Lincolnshire, December 25, 1642, being the son of Isaac Newton, farmer and proprietor of the manor of Woolsthorpe. He was sent at an early age to the village school, and in his twelfth year to the town of Grantham, where he remained till he was entered at Trinity College, Cambridge, in 1660. In 1663–64 he discovered the formula known as Newton's Binomial Theorem (see *Binomial*); and before 1665 he had established his doctrine of fluxions. Some years later Leibnitz also discovered this invaluable method, and presented it to the world in a different form—that of the differential calculus. About this time (1665), being obliged to quit Cambridge on account of the plague, he retired to Woolsthorpe, where the idea of universal gravitation is said to have first presented itself to him, from observing the fall of an apple in his garden. In 1666 he returned to Cambridge, was chosen fellow of his college (Trinity College) in 1667, and the next year was admitted A.M. By this time his attention had been drawn to the phenomena of the refraction of light through prisms, and to the improvement of telescopes. His experiments led him to conclude that light is not



Sir Isaac Newton.

a simple and homogeneous substance, but that it is composed of a number of rays of unequal refrangibility, and possessing different colours. In 1669, being appointed professor of mathematics at Cambridge, and preparing to lecture on optics, he endeavoured to mature his first results, and composed a

treatise on the subject. In 1672 Newton was chosen a fellow of the Royal Society, to which he communicated a description of a new arrangement for reflecting telescopes, which rendered them more convenient by diminishing their length without weakening their magnifying powers; and soon after, the first part of his labours on the analysis of light. This led him into controversies with Hooke, Huygens, and several eminent foreigners, Newton maintaining the corpuscular theory, now generally given up in favour of the undulatory theory. In 1675 he addressed another paper to the Royal Society, completing the account of his results and of his views on the nature of light. This treatise, united with his first paper on the analysis of light, afterwards served as the base of the great work, Treatise on Optics (1704). He had before this deduced from the laws of Kepler the important law that gravity decreased with the square of the distance, a law to which Sir Christopher Wren, Halley, and Hooke had all been led by independent study. No demonstration of it, however, had been given, and no proof obtained that the same power which made the apple to fall, was that which retained the moon and the other planets in their orbits. Adopting the ordinary measure of the earth's radius, Newton had been led to the conclusion that the force which kept the moon in her orbit, if the same as gravity, was one-sixth greater than that which is actually observed, a result which perplexed him, and prevented him from communicating to his friends the great speculation in which he was engaged. In June, 1682, however, he had heard of Picard's more accurate measure of the earth's diameter, and repeating with this measure his former calculations, he found, to his extreme delight, that the force of gravity, by which bodies fall at the earth's surface, 4000 miles from the earth's centre, when diminished as the square of 240,000 miles, the moon's distance, was almost exactly equal to that which kept the moon in her orbit. Hence it followed that the same power retained all the other satellites round their primaries and all the primaries round the sun. Two years were spent in penetrating the consequences of this discovery, and in preparing his immortal work Philosophiæ Naturalis Principia Mathematica, commonly called 'Newton's Principia,' which was printed in 1687 at the expense of Dr. Halley. In 1687 Newton was one of the delegates sent by the University of Cambridge to maintain its rights before the High Commission Court when they were attacked by James II., and in 1688 he was elected by the university to the Convention Parliament. In 1696 he was appointed warden of the mint, and in 1699 master. In 1701 he was again returned to parliament by his university; in 1703 he was chosen president of the Royal Society; and in 1705 was knighted by Queen Anne. In his later years he took great interest in chemistry, and in the elucidation of the sacred Scriptures. His health was good until his eightieth year, when he suffered from a calculous disorder, which occasioned his death, March 20, 1727. He was interred in Westminster Abbey. The most important of Newton's philosophical works are his Principia; his Arithmetica Universalis; his Geometria Analytica; his Treatise on Optics, published in 1705; and his Lectiones Opticæ, published after his death. His literary and theological works are his Chronology; his Observations on the Prophecies of Holy Writ, viz. Daniel and the Apocalypse; and his Historical Account of two Notable Corruptions of Scripture.

Newton, JOHN, English divine, born in London 1725, died there 1807. When eleven years old he was taken to sea by his father, then master of a ship in the Mediterranean trade. His subsequent life was of a rather irregular description until his thirtieth year, when he resolved to qualify himself for holy orders. He was ordained to the curacy of Olney, in Buckinghamshire, in 1764. During his incumbency at Olney he became acquainted with the poet Cowper, who contributed sixty-eight hymns to the collection published by Newton in 1776, and known as the Olney Hymns. In 1779 Newton was presented to the living of the united parishes of St. Mary Woolnoth and St. Mary Woolchurch Haw, London, and held it till his death. His best-known works are his Autobiography (1764), a Review of Ecclesiastical History (1770), and the Olney Hymns.

Newton Abbot, a market town of England, in Devonshire, at the head of the Teign estuary, 16 miles south of Exeter. It annually sends off about 6000 tons of fine potter's-clay to Staffordshire, and it is the seat of the engine-works of the Great Western Railway. It has a fine parish church in the perpendicular style, and an extensive nunnery. Pop. 9826.

Newton-in-Makerfield, or NEWTON-LE-WILLOWS, a town of England, in Lanca-

shire, 15 miles east by north of Liverpool. Here are paper-works, glass-works, an iron-foundry, and a sugar-refinery, besides an establishment for the manufacture of trucks for the London and North-Western Railway. Pop. 1891, 12,861.

Newton's Laws of Motion. See *Dynamics.*

Newton-Stewart, a town of Scotland in the county of Wigtown, on the Cree. It has lead-mines in the vicinity. Pop. 2645.

Newtown, a parliamentary borough and market-town, North Wales, county Montgomery, on the Severn. It has an ancient church (now in ruins) in the early English style. It is the chief seat of the Welsh flannel manufacture, which, however, is now falling off considerably, and being superseded by the manufacture of tweeds, shawls, &c. Newtown is one of the Montgomery district of parliamentary boroughs. Pop. 6974.

Newtown, a town of New South Wales, forming a suburb of Sydney, but under distinct municipal government since 1862. With Sydney merchants it is much in favour as a place of residence. Pop. 15,828.

Newtownards, a town, Ireland, county Down, at the north extremity of Lough Strangford, 9 miles east of Belfast. It consists chiefly of a handsome square, and several streets leading into it. The principal industry is flax-spinning. Pop. 8676.

New Westminster, a city of British Columbia, on the Fraser River, about 15 miles from its mouth, and near the western terminus of the Canadian Pacific Railway, and also connected by a short line with the U.S. railway system. It is the head-quarters of the foreign and river traffic of the province. Its chief industry is salmon canning. Pop. 1891, 6641.

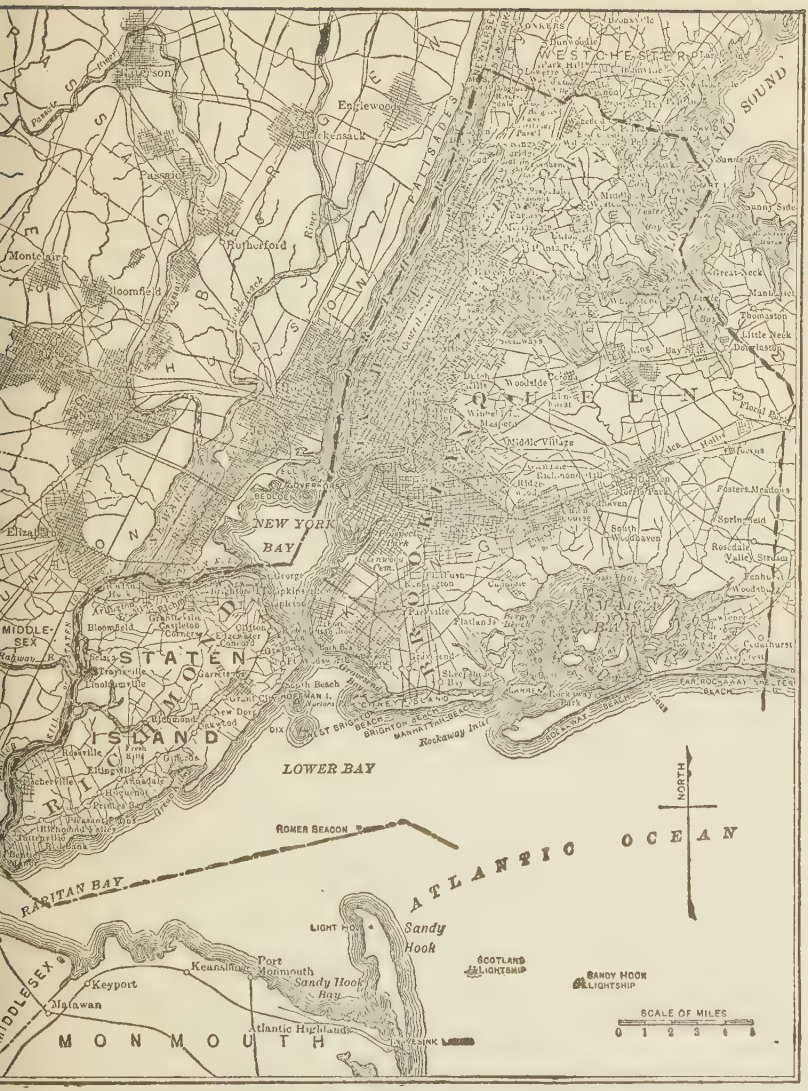
New Year's Day, the first day of the year, from the earliest times observed with religious ceremonies or festive rejoicing. New Year's Day, being the eighth day after Christmas, is the festival of Christ's circumcision. The day is a holiday, celebrated with religious service all over the European continent, though not generally in Britain nor in the United States.

New York, 'the Empire State,' one of the thirteen original United States of North America, having Canada on the north and north-west, from which it is almost entirely separated by the St. Lawrence, Lake Ontario, the Niagara river, and Lake Erie; south, Pennsylvania, New Jersey, and the Atlantic; and east, Connecticut, Massachusetts, and Vermont. Long Island belongs to the state, whose seaboard otherwise is very small. Total area, 49,170 square miles. The surface in the south-east is traversed by several mountain ranges from New Jersey, one of which, crossing the Hudson, presents a bold and lofty front on both banks, and forms magnificent scenery. The Catskill Mountains have the greatest average height, and in Round Top attain 3800 feet; but the culminating point is Mount Marcy, which belongs to the Adirondack group, and has a height of 5467 feet. In the west the large tract extending between Lake Ontario on the north and Pennsylvania on the south is generally level. The principal rivers are the Hudson, Delaware, Susquehanna, Mohawk, Oswego, Genesee, Niagara, Alleghany, and St. Lawrence. The falls of Niagara partly belong to the state. Besides the frontier lakes Ontario and Erie, there are many lakes of very considerable size, such as Lakes Champlain, George, Oneida, Cayuga, Seneca, &c. The climate is somewhat variable, but with some local exceptions very healthy. The greater part of the soil is arable, and New York occupies a foremost place in agriculture. The largest crops are oats, Indian corn, wheat, barley, and, to a greater extent than any other state, potatoes. Much attention is paid to the rearing of stock, both for feeding and for dairy purposes, more milk being produced than in all other states of the Union combined, and more butter and cheese than in any other state. The forest trees present a great variety, but the forest area, which used to include nearly half the state, has been much reduced of late years. The most important mineral is iron. Lead ore is also found, and a vast amount of salt is made from the salt springs. Granite, marbles, sandstones, limestones, clay, sand, and all building materials are abundant. The mineral springs of Saratoga are the most celebrated in America. The manufactures include from a fifth to a fourth of all the manufactures of the United States. The foreign and internal trade are of great importance. The latter is carried on chiefly by canals and railroads in conjunction with the Hudson. Of the canals the most important is the Erie Canal, which connects Lake Erie with the Hudson. (See *Erie Canal.*) The length of railways is over 7800 miles. Among religious denominations the Protestant Episcopalians,

Roman Catholics, Episcopal Methodists, Baptists, and Presbyterians are the most important. For the higher branches of education ample provision has been made, there being some thirty universities and colleges, and primary education is free. The state returns thirty-four members to the National House of Representatives, and has thirty-six votes for president. Albany is the capital, though this town is far below New York, Brooklyn, and even Buffalo in population. The territory of New York was partially explored in 1609 by Henry Hudson, an English navigator in the service of the Dutch East India Company, and soon after was colonized by the Dutch, who were expelled by the English in 1674. During the war with the French the country was laid almost desolate by the ravages of war and the incursions of Indians. In the revolutionary war many important events took place in New York territory. The first State constitution was adopted in 1777. Pop. in 1892, 6,483,632. Alien population, 720,605—one-ninth of the whole number.

New York, the chief city and seaport of the state of New York, and of the United States, and in respect of population and commerce the metropolis of the American continent. The city is admirably situated at the confluence of the Hudson River from the north, and the East River from the north-east (the latter a prolongation of Long Island Sound), their united waters expanding into New York Bay, which forms a magnificent harbour. The approach from the sea is either by the East River and Long Island Sound, or by the wide channel between Sandy Hook and Long Island, and thence by 'the Narrows' between Staten Island and Long Island; but the seaward approach by the latter route is obstructed by a bar having on it only 21 feet at low water. In the bay are several islands, on some of which are forts, and on one is the colossal statue of Liberty. The city consists of five Boroughs: Bronx, Brooklyn, Manhattan, Richmond and Queens. (*Which see*). It was incorporated Jan. 1, 1898, the city formerly being on Manhattan Island, but from that date embracing the adjoining cities and districts. The building material is stone of varying shades and qualities and red, yellow and white bricks, the artistic and substantial architecture being of an excellent character.

General Features.—The plan upon which the newer part of the old city is laid out consists of parallel *avenues*, 100 feet or more in width, named numerically from *first* to *eleventh*, and running from south to north as far as the northern extremity of Manhattan Island, intersected at right angles by *streets* also numerically named, and crossing the city from east to west. Fifth Avenue (7 miles long, 100 feet wide) is the great central avenue, and all the streets running east from it have the prefix *east*, and those running west the prefix *west*, and the houses are numbered accordingly. Fifth Avenue is *par excellence* the fashionable and aristocratic street. The main business thoroughfare is Broadway (5 miles long and 80 feet wide), which in the activity and variety of its traffic, the elegance of its shops, and the massiveness and grandeur of many of its public and private buildings, is one of the most interesting streets in the world. Madison Avenue, next east of Fifth Avenue, vies with it as a street of costly private houses and beautiful churches. The streets in general are excellently paved, and the cleansing of them well attended to. They are traversed by innumerable busses, horse and electric cars, supplemented by elevated railroads with steam motors giving a speed of 10 miles per hour; and underground railroads have received favourable consideration. Ferry-boats cross the Hudson and East River at all hours. A bridge across Harlem River and a massive viaduct take the trains of the great Eastern, Northern, and North-Western Railroads to the Grand Central Depôt. East River Bridge, the largest suspension-bridge existing, connects New York with Brooklyn. This bridge, 5989 feet long and 85 wide, costing over $15,000,000, was opened 1883. The great width of the Hudson opposite the city, and the necessity of keeping it an unimpeded highway of commerce, renders piers at intervals across the river inadmissible, but a great cantilever bridge is spoken of. Considerable progress has been made in the construction of a double tunnel beneath the Hudson, by which the trains of southern and western railroads will pass under the river directly into the city. Of the public parks the most important is Central Park, situated near the centre of Manhattan Island. Its length is 2½ miles and its width a little more than half a mile, giving an area of 840 acres. The other boroughs contain a number of beautiful parks, and Greenwood Cemetery, Brooklyn, has a national reputation. The school system is complete; an important



THE CITY OF GREATER NEW YORK

AND ITS ENVIRONS.

in 1888, 649,349. Capital, Wellington, in North Island; other chief cities: Dunedin, Auckland, Christchurch.

North Island, the most northern of the group, and separated from South Island by Cook's Strait, which, where narrowest, is about 25 miles wide, is very irregular in shape, and much broken by deep bays and projecting headlands. Its area is estimated at 44,736 square miles. It consists of a main body with projections running east, south, and west, and a long narrow projection 280 miles in length, which stretches north with a curve in a westerly direction. The main body of the island, as well as its peninsulas, has for the most part a very rugged and mountainous surface: and besides being traversed from south to north by chains of mountains reaching a height of 6000 feet, presents a number of lofty isolated volcanic peaks, among which the most conspicuous are Tongariro (6500 feet) occasionally active, and Ruapehu (9195 feet) and Mount Egmont (8300 feet), extinct volcanoes. The coast-line of North Island contains many excellent natural harbours, especially those of Wellington on Cook's Strait, and of Auckland on the isthmus of the northern projection. The chief indentations are Hauraki Gulf and Bay of Plenty in the north-east; Hawke's Bay in the east; South Taranaki Bight in the south-west. The streams are extremely numerous, but are mostly mere torrents, which bring down immense deposits of shingle. The largest of the rivers are the Waikato (200 miles) and the Wanganui (about 120). Most of the streams have their sources in lakes embosomed among mountains covered with magnificent forests, and presenting scenes of extraordinary beauty. The largest of all the lakes is Taupo, situated near the centre of the island, about 36 miles long by 25 miles broad. To the north-east occur a number of lakes, familiarly known as the 'Hot Lakes,' there being here hot springs and other volcanic phenomena. In this region there is much remarkable scenery, but the most interesting features, known as the Pink and White Terraces, were destroyed by a volcanic eruption in June, 1886.

South Island is of a much more compact and regular form, and may be considered as a parallelogram; area, about 55,225 square miles. With exception of the north coast, the south-west coast, and a remarkable spur on the east coast called Banks' Peninsula, the coast-line is very continuous. On the north coast, from Cape Farewell to Cape Campbell, are numerous good harbours; in the south-west are a series of narrow fiords. South Island is traversed from north to south by a lofty central mountain chain, which has an average height of about 8000 feet; while Mount Cook, near the west coast, the culminating point of New Zealand, is 13,200 feet high. Among these mountains are fields of perpetual snow, and glaciers of great size, stretching down on the south-west to no great distance from the sea. Along the east coast several extensive plains exist. The largest river is the Clutha, which has a course of 150 miles, and enters the sea near the south-east angle of the island. There is some magnificent lake scenery. The largest lakes are Wakatipu and Te Anau, covering 114 and 132 square miles respectively. *Stewart Island* is separated from South Island by Foveaux Strait, about 15 miles wide. It is of a triangular form, with an area estimated at 1300 square miles. A great number of smaller islands belong to the New Zealand group. The Chatham Islands and Kermadec Islands are outlying dependencies.

Minerals, Climate, Natural Productions.—With mineral wealth New Zealand is liberally supplied. Coal is obtained in many parts, and copper has been worked on a small scale. Gold is worked both in North and South Island. It was first practically discovered in 1861, and is obtained in two forms, namely, as veins in quartz reefs, and as alluvial gold. The total amount exported to year 1892 was £47,433,117. Extending through 12° of latitude, and having a greatly diversified surface, New Zealand has necessarily a very varied though a remarkably healthy climate. In temperature it resembles France and North Italy, but the humidity is considerably greater. Rapid changes are a notable feature of the weather. Among vegetable productions the most characteristic are the ferns (130 different species), which form almost the only vegetation over immense districts. Some of them are more than 30 feet high, and remarkable for the elegance of their forms. One of the most common is the *Pteris esculenta*, the root of which is used as food by the natives and greedily devoured by pigs. Another remarkable plant of great economical value (even furnishing an article of export) is the flax-plant (*Phormium tenax*). A number of the forest trees furnish valuable timber. Among others is the kauri or damar pine.

Flowering plants are remarkably scarce, and there are no indigenous fruits. The soil and climate of New Zealand, however, produce in perfection every English grain, grass, fruit, and vegetable. In the gardens of the warmer valleys fruits of a semi-tropical character—the pomegranate, citron, orange, and olive—might be raised. In animals New Zealand is singularly deficient, only a sort of dog (now extinct), a rat, and two species of bats being indigenous. Rabbits have been introduced and have multiplied so as to become a perfect pest; pigs now run wild as well as cats. Pheasants, partridges, quails, and red and fallow deer have also been successfully introduced. All the common European quadrupeds appear to be easily acclimatized. The native birds are remarkable neither for numbers nor for beauty of plumage. Pigeons and parrots are the most common. The apteryx, a peculiar bird so called from having no wings, is one of the most remarkable of the native birds. Among others are the huia or parson-bird and the owl-parrot. The gigantic moa is now extinct. The chief reptiles are a few lizards. The coast teems with fish, and seals are still numerous in some parts.

Aborigines.—The original natives of New Zealand, called Maoris, a people of Polynesian origin, are supposed to have emigrated from the Navigators' or the Sandwich Islands some centuries ago. Split up into numerous petty tribes, and wasting each other by internecine feuds, their numbers have been so reduced that they do not now much exceed 40,000, all of whom, with the exception of a few hundreds, are located in the North Island. By missionary efforts a great part of them have been converted to Christianity. They have acquired in many instances considerable property in stock, cultivated lands, &c., and in the neighbourhood of the settlements they are adopting European dress and habits.

Government, Education, &c.—By the constitution the crown appoints the governor; but the legislative power is vested in the General Assembly, or parliament of two houses—a Legislative Council consisting of fifty-four members nominated by the crown for life; and a House of Representatives, which is made up of ninety-five members elected by the people every three years. Representatives of the Maoris are admitted into both houses, and the members are paid. The governor is aided and advised by a ministry comprising the chief officers of state who are members of the General Assembly. By the act passed by the assembly in 1875, which abolished the provincial system, the powers previously exercised by superintendents and provincial officers were delegated to county councils or vested in the governor. The civil and criminal laws are the same as those of England. The revenue amounted in 1891 to £4,146,231; the net amount of the public debt (1892) was £37,677,619. For colonial defence a number of volunteers have been enrolled (about 8500); the chief ports are also being put in a state of defence. There is no state-aided church, but most Christian sects are well provided for. The Church of England is most numerously represented. Elementary education is free, secular, and compulsory. Secondary education is provided for in numerous high-schools, grammar-schools, colleges, &c. At the head of the higher education is the University of New Zealand, an examining body empowered to grant honours, degrees, and scholarships. Affiliated to it are several colleges throughout the colony. There is also a separate university at Dunedin. There are four training colleges for teachers, theological colleges, &c.

Industry, Commerce, &c.—Stock-rearing and agriculture are the most important industries, though mining is also an important occupation. There are about 17,000,000 sheep in the colony, and by far the most important export is wool (£4,129,686 in 1891), frozen meat and grain being also largely exported. Gold is the most valuable export next to wool (£1,007,172 in 1891); others are tallow, timber, kauri-gum. The imports naturally are chiefly manufactured goods: drapery, ironmongery, machinery, &c.; also tea, sugar, spirits, &c. There are upwards of 1800 miles of government railway in New Zealand open for traffic. The total value of imports in 1891 was £6,503,849; exports, £9,566,397.

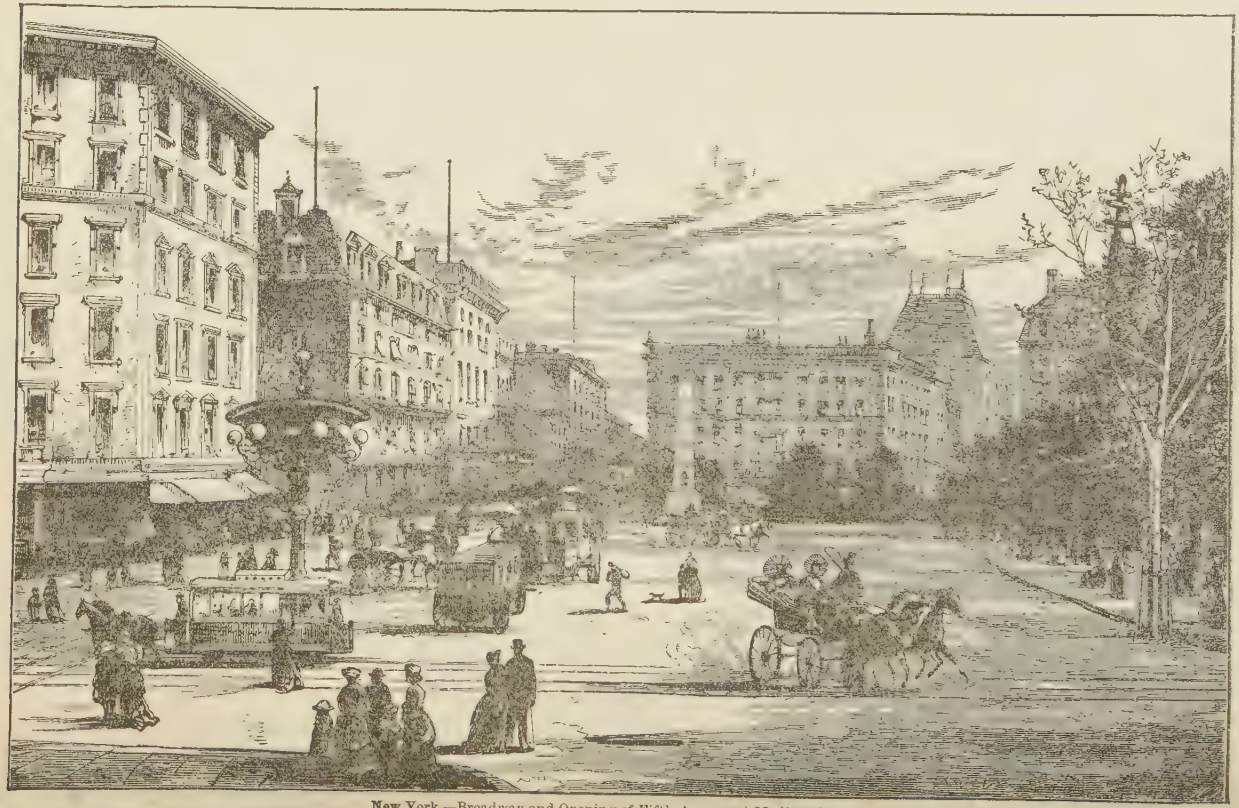
History.—New Zealand was first discovered by Tasman in 1642, but little was known of it till the visits of Cook in 1769 and 1774. The first permanent settlement was made by missionaries in 1815, but no regular authority was established by the British government till 1833, when a resident was appointed, with limited powers, and subordinate to the government of New South Wales. In 1840 New Zealand was erected into a colony; in 1841 it was formally separated from New South Wales and placed under its own independent governor;

seat of learning in the city is Columbia College, founded by charter of George II. in 1754. The college has 60 instructors and about 1500 students. The university of New York city, founded in 1831, has a large corps of instructors and about 800 students. There are also a number of medical schools and theological colleges and seminaries, besides the Cooper Union. The Metropolitan Museum of Art is rich in antiquities, paintings and curios. Among the monuments are statues of Washington, Lincoln, Farragut, Franklin, Shakspere, Burns, Scott, &c., an ancient Egyptian obelisk presented by the Khedive of Egypt; Bartholdi's great statue of Liberty already referred to (see *Colossus*); &c. Among the numerous public libraries may be noted the Astor Free Library, containing 238,946 volumes; the Mercantile Library, with 239,793 volumes, a fine circulating library belonging to its members, but accessible also to others; the Lenox Library, with a collection of rare books numbering 30,000, valuable manuscripts, choice paintings, sculptures, ceramics, &c. Theatres and other places of amusement are numerous. In summer there is a great exodus to watering-places and other adjacent pleasure resorts.

Trade, &c.—New York is primarily a commercial city and a centre of distribution of domestic and foreign products, but it is also the centre of a vast manufacturing interest. The industries, however, are more of a varied character than individually important, the chief being connected with clothing, meat-packing, printing and publishing, brewing, &c. In 1890 the imports amounted to $537,696,340, and the exports to $386,391,450, Great Britain sending $110,360,291 of the imports and taking $180,265,980 of the exports. Immense numbers of immigrants from Europe arrive here. The piers and wharves of the city are constructed almost entirely of wood, and project from the land into the water, the vessels being moored end on. A plan for stone piers and wharves has been adopted, and is being carried out. The total area is 196,800 acres; votes cast at first city election, 537,744; assessed value of real estate, $2,367,659,607; personal property, $404,001,063; budget of taxation, $64,000,000. Out of 150 members of the State Assembly Greater New York sends 61, and of 50 State Senators, 20, together with 16 members to the lower House of Congress. Each borough has its local board of officers under the Mayor of Greater New York. The water supply is furnished from Croton Lake, an artificial reservoir supplied by Croton River, from which the water is conveyed by an aqueduct of stone masonry of a capacity of 115,000,000 gallons per day a distance of 40 miles to New York.

History.— Manhattan Island was first visited in 1609 by Henry Hudson. It was first settled three years after on the southern extremity. The Dutch settlement here formed, gradually grew into a town named New Amsterdam, which in 1648 had 1000 inhabitants. In 1664 it surrendered to the British, and took its new name from the Duke of York, into whose hands it came. In 1673 the Dutch regained possession, but lost it finally in the following year. New York was taken from the Americans by the British at the beginning of the war of Independence (26th August, 1776), and held by them till its close (evacuated 25th November, 1783). It was the capital of the state of New York from 1784 to 1797, and from 1785 to 1790 it was the seat of the Federal government, and at New York Washington was inaugurated to the presidency in 1789. During the war of 1812–15 its foreign commerce was almost annihilated. The first regular line of packet ships to Liverpool was started in 1817. The opening of the Erie Canal in 1825 gave the city a pre-eminent command of internal commerce. Since that date its progress has been rapid, almost beyond example. Pop. in 1850, 515,547; in 1870, 942,292; in 1880, 1,206,600; in 1892, 1,800,891; in 1898, 3,500,000.

New Zealand, a group of islands belonging to Great Britain in the South Pacific Ocean, consisting chiefly of two large islands, called North and South (or Middle) Island, and a third of comparatively insignificant size, Stewart Island; length of the group, north to south, measured on a line curving nearly through their centres, about 1200 miles; area, 105,340 square miles (or 15,000 less than the U. Kingdom). Previous to 1876 New Zealand was divided into nine provinces, four in the North Island (Auckland, Taranaki, Wellington, and Hawke's Bay) and five in the South Island (Nelson, Marlborough, Canterbury, Otago, and Westland); but in 1876 the provinces as such were abolished, though the names are still in common use, and the whole of New Zealand is now divided into 63 counties. Pop. 1891: European population, 626,658; Maoris or aborigines, 41,993; Chinese, 4444; total, 668,651;



New York.—Broadway and Opening of Fifth Avenue at Madison Square.

and in 1852 it received a constitution and responsible government. Troubles with the natives of the North Island about land have given rise to frequent Maori wars, and so late as 1886 a disturbance about land arose. In 1865 the seat of government was removed from Auckland to Wellington. In 1873 the Public Works Policy was inaugurated, and large loans were raised for immigration, harbours, railways, roads, &c. In 1876 the provinces were abolished; the colony was divided into 63 counties, and all government centralized at Wellington. Recently (1890) proposals have been discussed for a federal union of New Zealand and the other Australian Colonies.

New Zealand Flax. See *Flax* (*New Zealand*).

New Zealand Spinage (*Tretragonia expansa*), a succulent trailing plant inhabiting New Zealand, Tasmania, Australia, South America, and Japan. It has been introduced into Europe and N. America as a substitute for spinage.

Ney (nā), Michel, Duke of Elchingen, Prince of the Moskwa, marshal and peer of France, was born in 1769 at Sarre-Louis, in the department of the Moselle. He entered the military service in 1788 as a private hussar, and rose by degrees to the rank of captain in 1794, adjutant-general in 1796, general of division in 1798, and as such he distinguished himself in the Rhine campaign. Appointed marshal of the empire by Napoleon in 1805, he achieved victory over the Austrians at Elchingen, and took part in the battle of Jena. During the Russian campaign he commanded the third division at the battle of the Moskwa, and conducted the rear-guard in the disastrous retreat. In the campaign of 1813 his skill and courage decided the victory of Lützen, and assisted at Bautzen and Dresden. When Napoleon abdicated and the Bourbon dynasty was established Ney took the oath of allegiance to the king and received a command; but when the emperor landed from Elba his old general joined him at Lyons and opened the way to Paris. In the campaign which followed it was Ney who led the attack on the British centre at Waterloo, and after five horses had been killed under him he only retired from the field at nightfall. When the allies entered Paris he escaped in disguise to the provinces, but was finally arrested, brought back to Paris, tried for treason, and found guilty. The sentence was executed 7th December, 1815.

Ngami, a South African lake to the north of the Kalahari Desert; length about 37 miles, breadth about 15 miles. It is for the most part shallow; its only feeder is the Teoge, and its outlet the Zouga. During the rainy season the water is fresh, but in the dry season it becomes brackish. Ngami was first visited by Dr. Livingstone and Mr. Oswell in 1849.

Nganhwuy (ngän-hwī'), province of China, bounded by the provinces of Kiangsu, Honan, Hupeh, Kiangsi, and Chekiang. Green tea is extensively cultivated, and the province is rich in minerals. Pop. 20,596,988. Capital Ngan-king-foo, on the left bank of the Yang-tse-kiang; pop. 40,000.

Niagara Falls, Niagara co., N.Y., 22 m. N. W. of Buffalo. Pop. 1890, 5502.

Niag'ara, a river of North America, separating Ontario from the state of New York, and conveying the waters of Lake Erie into Lake Ontario. It is 33½ miles long, and varies in breadth from 1 to 4 miles, being about the former where it issues from Lake Erie, near the city of Buffalo. It is occasionally interspersed with low wooded islands, the largest of which, Grand Island, has an area of 17,000 acres. The total descent in the river's course between the two lakes is 331 feet. About 15 miles from Lake Erie a sudden narrowing and descent in the channel causes what are called the Rapids, below which the river, here divided by Goat Island, is precipitated over the celebrated Falls. The rush of the river is such that the water is shot a clear 40 yards from the cliff, leaving a narrow pathway for a short distance below for the adventurous. The cataract on the south side of the island, called the American Fall, is 162 feet high, width 1125 feet; that on the Canadian side, called the Great or Horse-shoe Fall, is 149 feet high, width 2100 feet. Below the falls the river rushes with great velocity down the sloping bottom of a narrow chasm for a distance of 7 miles. About 3 miles below the falls a sudden turn in the channel causes the water to whirl in a vast circular basin before renewing its journey. Logs and other floating material sometimes continue whirling here for many days. About one-eighth of a mile below the falls a suspension bridge 1190 feet long and 190 feet above the water crosses the river, and another 245 feet above the water has been constructed for railway and ordinary passenger traffic about 2 miles below the falls. An international reservation of the land round the falls, to be pre-

served in a state of nature, was effected in 1885.

Niagara Falls, POWER PLANT, was constructed from the plans of the International Niagara Commission which met in London, England, 1889. They considered the utilization of electricity and compressed air for the conveyance of the power and selected the former: with a canal, one m. in length with wheel-pits 178′ deep, 140′ long and 20′ wide, each pit having a turbine wheel weighing forty tons. The turbines are attached to a dynamo each one of which develops five thousand horse-power. There are now twenty in operation and provision is arranged for more. A tunnel cut through solid rock carries off the waste water. Buffalo, twenty miles distant, and other cities are furnished with this electric current.

Niam Niam, a negro race inhabiting a district of North Central Africa extending from 29° to 24° E. lon., and probably further to the west; and from about 4° to 6° N. lat. The Niam Niam are a hunting and agricultural people, and are of a compact and powerful build, with long nose, small mouth, broad lips, and reddish-brown or copper-coloured skin. Apparently at a comparatively recent period they have wandered from the west to their present habitation, and have become masters of the country. They have a well-founded reputation for cannibalism, though some tribes seem to have renounced the practice.

Niare, or BUSH COW (*Bos brachyceros*), a small wild ox, native to Western Africa.

Nias, an island in the Malay Archipelago, lying west of Sumatra; length about 70, breadth about 20 miles. Its inhabitants, of the Malay race, are numerous, industrious, and frugal, but at the same time avaricious, vindictive, and sanguinary. Rice, sugar, and pepper are grown extensively. It belongs to the Dutch. Pop. 100,000.

Nibelungenlied (nē′bĕ-lụng-ĕn-lēt; 'Lay of the Nibelungen'), German epic written in the Middle High German dialect, and dating from about the 12th century. It is divided into thirty-nine sections, contains some 6000 lines, and is constructed in four-lined rhymed stanzas. The tale, briefly told, is this: Kriemhild lives with her brother Gunther, king of Burgundy, at Worms. To his court comes Siegfried, son of Siegemund, king of the Netherlands. This Siegfried is possessed of the Nibelungen gold hoard, a magic sword, a cloak of darkness, besides great strength and courage. Thus equipped he comes to the court and wins the love of Kriemhild. In gratitude for his success Siegfried undertakes to assist Gunther, the brother of his bride, in his efforts to win the hand of Brunhild, an Icelandic princess. Together they sail for the far north, and there Gunther succeeds, with the help of Siegfried's cloak of darkness, in winning the three test games of skill which the lady played with him. Still on the bridal night the princess mocked at Gunther her husband, wrestled with him, bound him, and hung him up scornfully against the wall. But the next night Gunther, with the invisible help of his friend Siegfried, overcomes the bride, and the latter carries away her girdle and ring. Siegfried and his wife Kriemhild next appear on a visit to the Burgundian court at Worms, where Gunther the king now resides with his wife Brunhild. While there the two ladies quarrel, and in her rage Kriemhild taunts Brunhild with having had dealings with her husband Siegfried, and in proof thereof she produces the ring and girdle which he took from her chamber on the bridal night. Brunhild bitterly resents this calumny and meditates vengeance. This she accomplishes by the hand of Hagen, one of her husband's warriors, who slays Siegfried in his sleep. The widow's revenge completes the story.

Nicæ′a (Nice), an ancient city of Asia Minor, capital of Bithynia, about 45 miles S.E. of Byzantium. Under the Roman Empire it retained long an exalted rank among the eastern cities, and is renowned in ecclesiastical history for the famous council held here in the reign of Constantine (A.D. 325), in which the formula bearing the name of the Nicene Creed was drawn up. After the foundation of the Latin Empire in Constantinople in 1204 the Greek Emperor Theodorus Lascaris made Nicæa the capital of his empire, which it continued to be until in 1261 the Greek emperors recovered Constantinople. It was finally taken by the Turks in 1330.

Nican′der, a learned Greek physician and poet, a native of Claros, near Colophon, in Ionia, who flourished about 185–135 B.C. Two of his poems are extant.

Nicarag′ua, a republic of Central America, extending from the Pacific Ocean to the Caribbean Sea, and having on the north and north-east the state of Honduras, and on the south Costa Rica; area, about 51,660

sq. miles. The state is traversed by the Cordillera of Central America, between which and the Pacific coast there is a remarkable depression extending for 300 miles and containing Lake Nicaragua (which see) and the smaller Lake Managua at no great elevation above the sea. Along the coast is a chain of volcanic cones, rising in some cases to 7000 feet. From the Cordillera the surface slopes to the Caribbean coast (Mosquito Territory), which is low and swampy. Nicaragua has a considerable number of rivers, the chief flowing to the Caribbean Sea, as the Coco and the San Juan. Veins of silver, copper, and gold occur. The climate is on the whole healthy, the interior and mountainous parts being more dry and cool than on the coasts. The vegetable productions include indigo, sugar, coffee, cacao, cotton, maize, rice, &c. Fruits of various kinds are plentiful. One of the principal sources of wealth consists in cattle, of which there are great numbers, the high plains affording excellent pasturage. The capital is Managua. In 1821 Nicaragua joined Guatemala, Costa Rica, Honduras,

Nicaragua Canal.

and Salvador in revolting against Spain, and after a sanguinary civil war it achieved independence. It has been the scene of various revolutions and counter-revolutions. The republic is governed by a president elected every four years, a Senate and a House of Representatives elected by universal suffrage. The principal exports are caoutchouc, coffee, hides, dye-wood, and indigo. Corinto on the Pacific and San Juan del Norte or Greytown on the Caribbean Sea are the chief ports. The population, 1889, consisted of 282,845, or, including uncivilized Indians, 312,845.

Nicaragua, Lake of, an extensive sheet of water in Central America, in the state of same name, 90 miles long north-west to south-east; greatest breadth, 40 miles; mean, 30 miles; 110 feet above the Pacific, from which it is separated by a strip of land 12 miles wide. The river San Juan de Nicaragua flows from its south-eastern extremity into the Caribbean Sea, and at its north-western extremity it is connected with the smaller Lake of Managua or Leon by the river Penaloya. Steamers now ply upon it, as it forms a link in the traffic route across the isthmus of Central America. See next article.

Nicaragua Canal, a canal that is to be constructed for the purpose of providing a waterway for ships across Central America from the Pacific to the Atlantic, passing through Nicaragua, and utilizing Lake Nicaragua and the San Juan River. A beginning has recently been made, and the total length of the route will be 170 miles from Greytown on the Caribbean Sea to Brito on the Pacific. Of this 64½ miles will consist of free navigation in the San Juan River, and 56½ of free navigation in Lake Nicaragua, total 121 miles. There will be 16 miles of excavation on the east side, 11¼ miles on the west, with ⅔ mile for six locks, making a total excavation of 28 miles. In basins now existing or to be constructed by means of dams and embankments there will be navigation for 21 miles. Besides the six locks on the west side there will be two on the east. The work is to be carried on by U. States capitalists at an estimated cost of $65,000,000.

Nicaragua Wood, the wood of a tree growing in Nicaragua, supposed by some to be a species of *Cæsalpinia*, and by others of

Hæmatoxylon. This wood and a variety called peach-wood are exported for the use of dyers.

Nicas'tro, a town in S. Italy, province of Catanzaro, situated w. of the Apennines, in the Bay of Sant' Eufemia. It is the see of a bishop and a place of considerable trade. Pop. 14,179.

Niccoli'ni, Giovanni Battista, an Italian dramatist, born 1785, died 1861. He studied at the University of Pisa; published his first poem in 1804; became in 1807 librarian and professor of history in the Academy of Fine Arts in Florence, and in 1810 produced Pollissena, his first tragedy. Other tragedies followed, partly on classical, partly on modern subjects, which procured for their author a wide fame.

Nice (nēs; Italian, *Nizza;* ancient, *Nicæa*), a city and seaport of France, on the Mediterranean, capital of the department of Alpes Maritimes, beautifully situated near the base of the Maritime Alps, and on both sides of the Paglion, a mountain torrent of short and rapid course. The original town was clustered round a hill near the shore, crowned by a strong castle. The new city lies to the west and north of this, on the right bank of the Paglion, and continues to spread rapidly. There are two squares, many fine boulevards; along the whole front of the city towards the sea is a broad public promenade, and the pier has a bathing establishment attached. Nice is much resorted to as a health resort during winter. The climate is mild, the mean temperature being 60° F.; but the changes of wind are sudden, especially in spring. Nice possesses silk, cotton, and paper mills, oil-mills, &c. The harbour or port is small and open to the south-east. The exports consist principally of oil, wine, and silk, with essences, perfumes, &c. Nice belonged to Italy previous to 1860. Pop. 1891, 88,273.

Nice, Councils of, ecclesiastical councils held at Nice or Nicæa, in Asia Minor, in 325 and 787. The object of the first Council of Nice, which was convened by Constantine, was to settle the controversies which had arisen in regard to the doctrine of the Trinity. The session lasted about two months. A creed was adopted by the council in its later form known as the Nicene Creed (which see). The council of 787 was summoned by the Empress Irene, with the concurrence of the pope, and it decreed that images were to be used as aids to devotion.

Nicene Creed, a summary of Christian faith adopted by the Council of Nice against Arianism A.D. 325, altered and confirmed by the Council of Constantinople A.D. 381. Its characteristics are the insertion of the term 'of one substance with the Father,' directed against the Arian heresy; the insertion of the words 'and the Son;' and the omission of the clause 'He descended into Hell.' It is recited both in the Roman Catholic and in the Anglican Church liturgies.

Niche, a recess in a wall for the reception of a statue, a vase, or of some other ornament.

Nichol (nik'ol), John, LL.D., son of Professor John P. Nichol, born at Montrose 1833; educated at Glasgow and Oxford Universities. From 1861 to 1889 he was professor of English Literature in Glasgow University. Besides his contributions to the Encyclopædia Britannica and the Westminster and North British Reviews, &c., he has published the following:—Hannibal (1872), a dramatic poem; Tables of European Literature and History (1876); Tables of Ancient Literature and History (1877); English Composition (1879); Byron (1880); The Death of Themistocles and other Poems (1881); American Literature (1882); Kant (1889); &c.

Nichol, John Pringle, LL.D., astronomer, born 1804 in Brechin, Forfarshire, died 1859. Licensed for the Scottish Church, he turned his attention to astronomy, and acquired so much reputation that in 1836 he was appointed professor of astronomy in Glasgow University. Among Dr. Nichol's literary works may be mentioned: The Architecture of the Heavens (1838); Contemplations on the Solar System (1838); The Stellar Universe (1848); and the Planetary System (1851). He likewise edited a Cyclopædia of Physical Sciences, published in 1857.

Nicholas I. (Nikolai Pavlovich), Emperor of Russia, third son of the Emperor Paul I., was born 1796, died 1855. He ascended the throne in 1825. He made war with Persia in 1827–28; joined in the Treaty of London, which secured the independence of Greece; and made one of the allied powers who destroyed the Turkish fleet at Navarino in 1827. This affair led to war between Russia and Turkey, in which the latter was defeated, paid indemnity, and signed the treaty of peace at Adrianople in 1829. He suppressed the Polish insurrection which broke out in the following year with relentless severity. In 1848 Nicholas assisted

Austria with an army corps in putting down the rising in Hungary. Early in 1852 began the Russian effort to take over the holy places and assume the protectorate of the Christians in Palestine. This led to the Crimean war, before the close of which Nicholas died from lung disease.

Nicholas, St., Bishop of Myra, in Lycia, is believed to have lived under Diocletian and Constantine, and to have suffered persecution under the former; but little is known of his life. His feast-day in the Roman calendar is Dec. 6; he is the patron saint of poor maidens, sailors, travellers, merchants, and children (Santa Klaus), and is one of the most popular saints in the Greek Church.

Nicholls, Mrs. See *Brontë, Charlotte.*

Nicholson, John, brigadier-general, born in Dublin 1822. He had a distinguished career in India, and was killed at the siege of Delhi (1857).

Ni'cias, Athenian statesman and general, who displayed much skill and activity in the time of the Peloponnesian war. He was put to death after the ill-success of his expedition to Sicily (B.C. 413).

Nickel, a metal of a white colour, of great hardness, very difficult to be purified, always magnetic, and when perfectly pure malleable and ductile; chemical symbol Ni, atomic weight 59 nearly. It unites in alloys with gold, copper, tin, and arsenic, which metals it renders brittle. With silver and iron its alloys are ductile. Nickel is found in all meteoric stones, but its principal ore is a copper-coloured mineral found in Germany. Nickel has become an object of considerable importance, and is extracted from several pyrites, compounds of nickel, cobalt, antimony, arsenic, sulphur, or iron. The salts of nickel are mostly of a grass-green colour, and the ammoniacal solution of its oxide is deep blue. Nickel mixed with brass in varying proportions is now well known and largely used as German silver or nickel silver. Another important use of the metal is for coating articles by the electro-plate process. In the U. States coins of small value are made of nickel. Harveyized steel, used for armor plate, is a combination of steel and nickel.

Nickel-glance, a grayish-white, massive, and granular ore of nickel, consisting of 35·5 nickel, 45·2 arsenic, and 19·3 sulphur.

Nickel-plating is the process by which a coating of nickel is placed upon another metal, and the essentials of the process, as in electro-plating, are a proper solution of the metal and an electric battery. See *Electro-plating.*

Nicobar' Islands, a group situated in the Indian Ocean north-west of Sumatra; area, about 426 square miles. They are well wooded and yield cocoa-nuts and tropical fruits in abundance. The natives, who seem to be of the Malay race, are reported to be lazy, cowardly, and treacherous. Cocoa-nuts are extensively exported, also edible-nests, trepang, &c. The islands were occupied by Britain in 1869, and are governed along with the Andamans, the chief station being Nancowry, with a fine harbour. Pop. 6000.

Nicol, Erskine, A.R.A., painter, born in Leith 1825; received his education in art at the Trustees' Academy, Edinburgh; resided some time in Ireland, where he received his peculiar bent as a delineator of Irish life and manners; settled in London (1862), and contributed regularly to the Royal Academy, of which he was elected an associate in 1866. Among his well-known pictures of Irish subjects are Notice to Quit, Renewal of the Lease Refused, Bothered, Among the Old Masters, and Interviewing the Member.

Nicolaiev', or Nicolaef', one of the principal naval stations of Russia, on the Black Sea, in the government of Kherson and 36 miles north-west of the town of Kherson, at the confluence of the Ingul and Bug. It occupies a large space, is fortified and well built, with wide streets and a finely planted boulevard. It was founded in 1791, and since its connection with the Russian railway system its trade and importance have vastly increased. Pop. 66,335.

Nicola'itans, a sect in the early Christian Church, so named from *Nicolas*, a deacon of the church of Jerusalem. They are characterized as inclining to licentious and pagan practices, Rev. ii. 6.

Nic'olas, St., a town in Belgium, in East Flanders, 19 miles E.N.E. of Ghent, in one of the best cultivated and most populous districts in Europe. Its manufactures are cotton, woollen, linen, and silk goods, lace, &c. Pop. 25,914.

Nic'olas, Sir Nicholas Harris, English writer, son of a naval officer, born 1799, died 1848. He entered the navy; attained the rank of lieutenant; afterwards studied law, and was called to the bar in 1825. He wrote a number of valuable biographies for the Aldine edition of the poets, and among his many works are Synopsis of the Peerage of England; The Chronology of History;

History of the Orders of Knighthood of the British Empire; Despatches and Letters of Lord Nelson; Memoirs of Sir Christopher Hatton.

Nicole, PIERRE, a French writer, one of the so-called Port-royalists, born at Chartres 1625, died at Paris 1695. From the provinces he proceeded to Paris, where he studied theology; afterwards he entered Port Royal, where he was engaged in teaching and associated himself with Arnauld in the preparation of his work on logic. Besides this he translated Pascal's Letters into Latin, and wrote Essais de Morale and Les Imaginaires et les Visionnaires, the latter provoking a severe attack from Racine.

Nicomedi'a, an ancient city of Asia Minor. See *Ismid.*

Nicop'oli, a city of Bulgaria, on the Danube, with a strong citadel and other works. Pop. 5000.

Nicop'olis ('City of Victory'), the name of many ancient cities. One of the most celebrated was in Epirus on the northern side of the Ambracian Gulf (Gulf of Arta), built by Augustus in commemoration of his naval victory over Antony at Actium.

Nicosia (nē-kō-sē'à), a town in the province of Catania, Sicily, 39 miles W.N.W. of the town of Catania, the see of a bishop. Pop. 15,226.

Nicosi'a, or LEFKOSI'A, the capital of the Island of Cyprus, situated in the centre of the island. Its lofty walls and bastions still present an imposing appearance, and it has a number of mosques and Greek churches, the residence of the High Commissioner, &c. It has manufactures of silk, cotton, leather. Pop. about 12,000.

Nicot (nē-kō), JEAN, born 1530, died 1600; was French ambassador at the court of Portugal, where he was presented with some seeds of the tobacco plant, which he introduced into France about 1560. The botanical term for tobacco (*Nicotiana*) is derived from his name.

Nicotia'na, the tobacco genus of plants. See *Tobacco.*

Nic'otine, a volatile alkaloid base obtained from tobacco. It forms a colourless, clear, oily liquid, which has a strong odour of tobacco. It is highly poisonous, and combines with acids, forming acrid and pungent salts.

Nictitating Membrane, or 'THIRD EYELID,' a thin membrane by which the process of winking is performed in certain animals, and which covers and protects the eyes from dust or from too much light. It is chiefly found in birds and fishes, and is represented in a rudimentary condition in man, and higher mammals generally, by the 'semi-lunar folds,' situated at the inner or nasal angle of the eye.

Niebelungenlied. See *Nibelungenlied.*

Niebuhr (nē'bör), BARTHOLD GEORG, historian, born at Copenhagen 1776 (see next article), died at Bonn 1831. He studied law at Göttingen, and philosophy at the University of Kiel; became, in 1796, private secretary to the Danish minister of finance, and soon after under-librarian in the royal library of Copenhagen; while in 1798 he visited England and attended the University of Edinburgh for one session. Niebuhr subsequently transferred his services to Prussia, and held various government offices. Having been appointed historiographer-royal he delivered lectures on Roman history in the University of Berlin, and in 1811 published them in two volumes. In 1816 he was appointed Prussian minister to the papal court at Rome and there he resided until 1822, chiefly occupied in historical research. At the latter date he returned to Bonn and became adjunct professor of ancient history at the university. Here he continued his Roman History, the third volume of which appeared after his death. He also superintended the Corpus Scriptorum Byzantinorum, and published various archæological and philological treatises. His Roman History covered only the period down to the first Punic war, but introduced quite a new era in the study of Roman antiquity.

Niebuhr, KARSTENS, a German traveller, father of the above, born in Hanover 1733, died 1815. In 1760 he entered the Danish service as lieutenant of engineers, and in the following year joined the expedition sent by Frederick V. of Denmark to explore Arabia. As the result of the expedition he published Beschreibung von Arabien (Copenhagen, 1772) and Reisebeschreibung von Arabien und anderen umliegenden Ländern (two vols. Copenhagen, 1774–78).

Niel (ni-el), ADOLPHE, French marshal, born 1802, died 1869. He was educated at the École Polytechnique, Paris, and the Military School, Metz; took part in the expedition against Constantine in Algeria; assisted as head of the staff of engineers at the siege of Rome in 1849 during the revolutionary movement under Garibaldi; commanded the engineers and planned the operations against Sebastopol in 1854–55; distinguished

himself in the Italian campaign of 1859, and was thereafter made a marshal of France by Napoleon III.

Niel'lo, a method of ornamenting metal plates, much practised in the middle ages, and which gave rise to copperplate engraving. The lines of a design were cut in the metal, and filled up with a black or coloured composition, which gave effect to the intaglio drawing.

Niemen (nyā'men), or MEMEL, a large river which rises in Russia, flows at first west through the government of Vilna and past the town of Grodno; then north, forming the boundary between Poland and the government of Vilna; then again west, separating Kovno and Poland; and finally enters East Prussia, passes Tilsit, and falls into the Kurisches Haff. It is 640 miles in length, and is navigable as far as Grodno, 400 miles.

Nièvre (nyāvr), a department of Central France, bounded by Yonne, Cher, Allier, Saône-et-Loire, and Côte-d'Or; area, 2631 square miles. It receives its name from the Nièvre, a small tributary of the Loire. It is generally hilly, is only of indifferent fertility, produces some good wine, and has nearly a third of its surface covered with wood. Its minerals include iron and coal, and the chief manufactures are woollen cloths, linen, cutlery, &c. Nevers is the capital. Pop. 343,581.

Niflheim, in Scandinavian mythology, the region of endless cold and everlasting night, ruled over by Hela.

Nigella, fennel flowers, a genus of annual plants, nat. order Ranunculaceæ.

Niger, the name of a great river of Western Africa, which rises on the north side of the Kong Mountains, flows north and north-east, afterwards turns south-east and south until, by various channels, it enters the Gulf of Guinea, its total length being about 2600 miles. Throughout its course the river is known under various names, such as Joliba, Kworra (Quorra), Mayo, &c. Not much is known of the river until it reaches Sego, about 340 miles from its source; but here it enters upon a fertile tract of country which continues until Timbuctoo is reached. Large islands divide the river channel, and its tendency here is to spread over the flat country in a net-work of small streams. At the town of Burrum, where it trends in a curve to the south-east, the river is known as the Mayo until it reaches its confluence with the Benué, where it becomes known as the Kworra. At Aboh, about 100 miles from the sea, the great delta of the Niger begins. This delta extends along the coast for about 150 miles, and is intersected by a net-work of channels and islands, the principal navigable courses being the Nun, Bonny, and Mari. Mungo Park was the first European who explored this river (1796–97).

Niger Protectorate, an extensive region of Western Africa under British protection, comprising the Niger delta, and a tract on both sides of the river more than 1000 miles from its mouth, as well as the valley of the Benué for a long distance. A great part of this tract is under the administration of the Royal Niger Company, a British company chartered in 1886, which maintains a police force and a small body of native soldiers to keep order. In 1898 the French encroached on this territory and caused great danger of war between that country and Great Britain.

Night-blindness, the medical term being *hemeralopia*, is a disease in which the eyes enjoy the faculty of seeing whilst the sun is above the horizon, but are incapable of seeing by the aid of artificial light.

Night-hawk, a species of goat-sucker (*Chordeiles virginiānus*), a bird universally known in the United States, 9½ inches in length and 23 in extent of wing. It is a bird of strong and vigorous flight, and its prey consists of beetles and other large insects. The other American species are the 'chuck-will's widow' (*C. carolinensis*) and the 'whip-poor-will' (*C. vociferus*), both of which, like the night-hawk, arrive in May, and leave the States in September.

Night-heron, a wading bird of several species belonging to the family Ardeidæ (herons and cranes). The species occur in Europe, Asia, Africa, and America. The common night-heron is the *Nycticorax Gardeni* or *europæus*. It is about 20 inches in length, and has three long narrow feathers proceeding from the nape of the neck, and hanging backwards.

Nightingale, a well-known passerine bird (*Luscinia philomela*) of the thrush family. The nightingale sings at night, and its famed chant is the love-song of the male, which ceases when the female has hatched her brood. It is a native of many parts of Europe and Asia, and of the north of Africa. It is migratory, extending its summer migrations as far north as the south of Sweden. In England, where it appears about the middle of April, it is rather a local bird, some parts appearing to be quite unsuited

to its habits; the northern counties are seldom visited, and in Scotland and Ireland it is unknown. It feeds on caterpillars and other larvæ, frequents hedges and

Nightingale (*Luscinia philomēla*).

thickets, and builds its nest on the ground or near it, laying four or five eggs of a blue colour. The young are hatched in June, and are prepared to accompany their parents in their southward migration in August. It is solitary in its habits, and its colouring is very inconspicuous. Another species inhabits South-eastern Europe.

Nightingale, FLORENCE, daughter of Wm. Shore Nightingale, Embly Park, Hampshire, was born at Florence 1823. At an early age she manifested a keen interest in suffering humanity, and from philanthropic motives she visited the chief military hospitals in Europe, and studied the chief nursing systems. During the Crimean war (1854) the hospital accommodation was found to be very defective, and Miss Nightingale promptly volunteered to organize a select band of nurses at Scutari. The offer was accepted by the War Office, and within a week Miss Nightingale was on her way to the East, where she rendered invaluable service to the sick and wounded by her incessant labours in nursing and hospital reform. The strain, both mental and physical, which this work demanded permanently injured her health; yet notwithstanding her confinement to a sick-room, she has continued to give her experience in the interest of hospital reform, and for this purpose she was consulted during the American Civil War and the Franco-German War. She has also published Notes on Hospitals (1859), Notes on Nursing (1860), On the Sanitary State of the Army in India (1863), Notes on Lying-in Institutions (1871), and Life or Death in India (1873).

Night-jar, one of the British names of the common goat-sucker.

Nightmare, a state of oppression or feeling of suffocation which sometimes comes on during sleep, and is accompanied by a feeling of intense anxiety, fear, or horror, the sufferer feeling an enormous weight on his breast, and imagining that he is pursued by a phantom, monster, or wild beast, or threatened by some other danger from which he can make no exertion to escape. The sufferer wakens after a short time in a state of great terror, the body often covered with sweat. The proximate cause of nightmare is said to be irregularity of the circulation in the chest or brain, and the disorder is generally due to repletion and indigestion, but sometimes to the fact of the sufferer lying in an awkward position in bed.

Nightshade, the English name of various species of plants, chiefly of the genus *Solānum* (to which the potato belongs). The woody nightshade or bittersweet (*S. Dulcamāra*) and common or garden nightshade (*S. nigrum*) are British plants, the first growing in hedges and among bushes, and the latter in gardens, fields, and waste places. The root and leaves of *S. Dulcamāra* are narcotic, and have been applied to various medicinal uses. The berries, if not absolutely poisonous, are suspicious. *S. nigrum* is fetid and narcotic, and has also been employed medicinally. *Deadly nightshade* is *Atrōpa Belladonna.* (See *Belladonna.*) For *enchanter's nightshade* see that article.

Nigrin, an ore of titanium, found in black grains or rolled pieces, containing about 14 per cent of iron. It occurs in Ceylon and Transylvania.

Nigritia. See *Soudan.*

Ni'hilists, the name at first applied specifically to the revolutionary party in Russia who accepted the destructively negative philosophy of Bakunin and Herzen, but now applied indiscriminately to Russian revolutionists. This name was given to the party by Tourgenieff in his stories of Russian society, and accepted by them as descriptive of their character. Their object was to destroy all forms of government, overturn all institutions, annihilate all class distinctions, sweep away all traditions. They left to future generations the task of constructing society out of the ruins left by their relentless destructive policy. For some years this propaganda was spread in printed and oral forms among the newly enfranchised serfs by thousands of young people of both sexes. About 1874, however, the Russian government began to interfere, the newspapers

which advocated the Nihilist doctrine were suppressed, foreign pamphlets seized, and large groups of the revolutionists summarily tried and condemned to death and exile. Hitherto the Nihilists had spread their principles by peaceful means, but after the trial in 1877, in which 99 persons were sent to Siberia, a secret and sanguinary struggle between armed assassins and the government began. The first startling indication of the new departure was the murder of General Trepoff by a young woman named Vera Sassulitch, and this was followed by the assassination of Generals Mezentzoff and Drenteln, Prince Krapotkin, and Commander Heyking. The incendiary followed the assassin. In June 1879 no fewer than 3500 fires broke out in St. Petersburg and other large towns, most of which were attributed to the Nihilists. Various attempts were made to assassinate the emperor. Four shots were fired at him by Solovieff, a train in which he was supposed to travel was wrecked by Hartmann, an apartment in the Winter Palace at St. Petersburg was blown up, and at last, in March 1881, Alexander II. was murdered by a bomb thrown beneath his carriage in the street near the palace. This terrible act seemed to exhaust the fury of the Nihilists. Lately, however, there has been a renewal of activity, but it finds expression in spreading socialism among the workmen of the towns, and is not strictly Nihilism.

Niigata (nē-i-gä′tȧ), the chief town of the province of Echigo, Japan, situated on the west coast of the island of Hondo and on the left bank of the Shinano. This port was opened to foreign trade by the treaty of 1860; but the obstructed state of the river, the open anchorage, and the severe winter has hitherto prevented the development of much trade. The town is well built, the streets are traversed by canals, there is an hospital and a college, and considerable coasting trade. Pop. 1891, 47,019.

Nijkerk (nī′kerk), a town of Holland, prov. Gelderland, near the Zuider Zee, with which it communicates by canal. Pop. 7599.

Nijmegen, NYMEGEN (nī′mā-gen), or NIMEGUEN (nim′e-gen), a city in the Dutch province of Gelderland, delightfully situated on the slopes of several hills, reaching down to the Waal. It has a fine old church (St. Stephen's), and a Renaissance town-hall of the 16th century. The industrial occupations include tanning, brewing, metal goods, cotton manufactures, &c. The town is celebrated for the treaty of peace concluded in 1678 between France and Holland, and Spain, and for that of 1679 between the German Empire, France, and Sweden. It was formerly a strong fortress, but the fortifications have been recently abolished. Pop. 1892, 32,990.

Nijni-Nov′gorod (nizh′nē), a town in Russia, capital of the government of same name, at the confluence of the Oka and Volga, 255 miles east of Moscow. The town forms three parts: the upper district, including the citadel; the lower portion, called the Nijni Bazaar; and the suburb, occupied by the great annual fair, and containing 6500 booths, besides other structures for its accommodation. This fair, begun in 1816, is held annually between July 15 and Sept. 1, O.S. Here there are gathered together an immense multitude of people (say 250,000) from all parts of Russia and many parts of Asia, and the annual value of the merchandise sold is estimated at about £30,000,000. The chief products sold are cotton, woollen, and linen goods, tea, silk and silk goods, metal wares, furs, leather, porcelain, earthenware, and glass, coffee, wine. Pop. 66,716.—The province has an area of 19,704 square miles. The surface forms an extensive plain, occasionally broken and diversified by low undulating hills. It is drained by the Volga. The soil is poor, and the crops, chiefly hemp and flax, not very abundant. A large part is covered with forests. Pop. 1,482,471.

Nijni-Tagilsk (nizh-nē-tȧ-gilsk′), a town of Russia amid the Ural Mountains, in the government of Perm, and 150 miles east of the town of Perm, in the midst of a district very rich in minerals. Pop. about 30,000.

Ni′kē, in Greek mythology, the goddess of victory. She was rewarded by Zeus with the permission to live in Olympus, for the readiness with which she came to his assistance in the war with the Titans. There is a temple to her on the Acropolis of Athens still in excellent preservation.

Nikolaef. See *Nicolaiev*.

Nikolaievsk′, a town of Russia, gov. of Samara, on the Igris, a tributary of the Volga. Pop. 10,007.

Nik′olsburg, or NIKLASBURG, a town of Austria, in Moravia, 27 miles south of Brünn. There are linen and woollen manufactures and some trade. Pop. 7642.

Niko′pol, a town, Southern Russia, government of Ekaterinoslav, on the Dnieper. Pop. 9706.

Nile, a great historic river in Africa, the main stream of which, known as the *Bahr-el-Abiad*, or White Nile, has its chief source in the equatorial lake Victoria Nyanza. What is known as the *Bahr-el-Azrek*, or Blue Nile, a much smaller stream, joins the White Nile at Khartoom, lat. 15′ 40° N. The source of the Blue Nile was discovered in the Abyssinian Highlands by Bruce in 1770, while the source of the other, or true Nile, was for long the subject of speculation and exploration. The discoveries, however, of Speke and Grant in 1861–62, and of Sir Samuel Baker in 1863–64, and subsequent explorers, have established the fact that the head-waters of the Nile are collected by a great lake situated on the equator, called Uker ewe or Victoria Nyanza. The Nile, near where it flows out of Lake Victoria, forms the unimportant Ripon Falls, then flows generally north-west; about lat. 1° 40′ N. it expands into Lake Ibrahim Pasha, afterwards forms the Falls of Karuma and the Murchison Falls, and then enters another lake, the Albert Nyanza, at an elevation of about 2550 feet. This lake, as has been recently discovered by Stanley, receives the waters of another lake further to the south-west, Lake Muta Nzige or Albert Edward, the channel of communication being the river Semliki. From the Albert Nyanza to the Mediterranean the general course of the Nile is in a northerly direction, with numerous windings. Above Gondokoro, about lat. 5° N., the river forms a series of cataracts; but between these falls and the Albert Nyanza, a distance of 164 miles, the river is broad, deep, and navigable. Not far below Gondokoro the Nile begins to flow more to the west till it reaches lat. 9° N., where it receives the Bahr-el-Ghazal, one of its chief tributaries. On receiving this affluent it turns due east for about 100 miles, and then after receiving the Sobat from the south-east flows almost due north to Khartoom. It receives its last tributary, the Atbara, from the Abyssinian frontier, for the rest of its course (some 1500 miles) being fed by no contributbry stream. Between this point and the frontiers of Egypt occur several rapids or cataracts presenting greater or less obstacles to navigation, there being also another cataract some distance below Khartoom. In Egypt, at the head of the Delta near Cairo, it divides into two main branches, leading down respectively to Rosetta and Damietta, where they enter the Mediterranean. As rain scarcely ever falls in the greater part of the valley of the Nile the river owes its supplies to the copious rains and the vast lake areas of the tropical regions in which it takes its rise, and its volume thus depends upon the season. It begins to increase in June, attains its greatest height about September, and then subsides as gradually as it rose. (See *Egypt.*) The ordinary rise at Cairo is about 40 feet. During the flood a great portion of the Delta, and of the valley of Egypt higher up, is inundated. This annual inundation, with all the bounty which it brings, is watched and waited eagerly, and no doubt it was from this character of benefactor that the Nile has been worshipped as a god alike by Egyptians, Greeks, and Romans. Its length is estimated at nearly 4200 miles, or rather less than that of the Mississippi-Missouri.

Nile, Battle of the. See *Aboukir.*

Nil-Ghau. See *Nyl-Ghau.*

Nilgiri Hills. See *Neilgherry Hills.*

Nilom'eter, an instrument for measuring the rise of water in the Nile during its periodical floods. The nilometer in the island of Rhoda (Er-Ródah), opposite to Cairo, consists of a slender graduated pillar standing in a well which communicates with the river. The pillar is divided into 24 cubits, each of which measures 21·4 inches. When the inundation reaches the height of 21 cubits it is considered adequate.

Nilsson, Christine, born at Hassaby, near Wexiö, in Sweden, 1843. Accompanied by her brother she used to sing at village fairs and places of public resort, where she also played on the violin. In 1857 her talent attracted the attention of a wealthy gentleman, who had her educated as a singer at Stockholm, and afterwards at Paris. In 1864 she made her first appearance as Violetta in La Traviata at the Théâtre Lyrique, Paris, and she appeared in 1867 for the first time at Her Majesty's Theatre, London. On several occasions she has visited America with the utmost success. Among her most famous impersonations are Ophelia in Thomas's Hamlet, and Margaret in Gounod's Faust. In 1872 she married M. Auguste Rouzaud, who died in 1882; in 1886 she married Count A. de Miranda.

Nimach, or Neemuch, a town and cantonment 312 miles S.W. of Agra, in the territory of Gwalior, Central India, on a rising ground 1613 feet above sea-level. Pop. of the town 5161, and of the cantonment 13,069.

Nimbus. See *Cloud.*

Nimbus, a term applied in art, especially in sacred art, to a kind of halo or disc surrounding the head in representations of divine or sacred personages; as also to a disc or circle sometimes depicted round the heads of emperors and other great men.

The Nimbus as variously represented in Sacred and Legendary Art.—1, God the Father. 2 and 3, Christ. 4, Charlemagne. 5, Emperor Henry II.

The nimbus in representations of God the Father is of a triangular form, with rays diverging from it all round, or in the form shown in the cut; the nimbus in representations of Christ contains a cross more or less enriched, that of the Virgin Mary consists of a circlet of small stars, and that of angels and saints is a circle of small rays. When the nimbus is depicted of a square form it indicates that the person was alive at the time of delineation. Nimbus is frequently confounded with *aureola* and *glory*.

Nimeguen. See *Nijmegen.*

Nîmes, or NISMES (nēm), a city of Southern France, capital of the department of Gard, 62 miles north-west of Marseilles. It is an episcopal see, and consists of an old central quarter surrounded by handsome boulevards, beyond which are the modern quarters. Its manufactures are chiefly of silk and cotton goods; it has a considerable commerce, and is the great entrepot of Southern France for raw silk. Among the buildings are the cathedral, the church of St. Perpetua, the Palais de Justice, &c.; but Nîmes is chiefly remarkable for its Roman remains, including an ancient temple, with thirty beautiful Corinthian columns, now serving as a museum and known as the *Maison Carrée;* the amphitheatre, a circus capable of seating 20,000 persons; the temple of Diana; the ancient Tour Magne, on a hill outside of the city, supposed to have been a mausoleum; and a Roman gateway. Nîmes (anc. *Nemausus*) is supposed to have been built by a Greek colony, and was afterwards for about 500 years in the possession of the Romans. In the 16th century it became a stronghold of Calvinism, and suffered much during the civil wars, as also by the revocation of the Edict of Nantes, and during the revolution; but latterly it is a busy manufacturing centre. Pop. 1891, 71,623.

Nimrod, described in Gen. x. 8 to 12 as a descendant of Ham, a son of Cush, a mighty hunter before the Lord, and the beginning of whose kingdom was Babel, Erech, Accad, and Calneh in the land of Shinar.

Nimrûd, the name given to the site of an ancient Assyrian city situated in the angle formed by the rivers Tigris and Zab, and about 18 miles below Mosul. It is one of the group of great cities which clustered round Nineveh, the capital, and it has been supposed, from inscriptions found in the ruins, that it is identical with the Calah mentioned in Genesis x. See *Nineveh.*

Nine-pins, a game with nine pins or pieces of wood set on end, at which a bowl is rolled for throwing them down.

Nin'eveh, an ancient ruined city, formerly capital of the Assyrian Empire, in Asiatic Turkey, and in the pashalic of Mosul, on the left bank of the Tigris, along which, and opposite to the town of Mosul, it occupied an extended site. The first recorded notice of Nineveh is in Genesis x. Again it is spoken of in the book of Jonah as a 'great city.' It remained the capital of Assyria till about 606 B.C., when it was taken and burned by the Babylonian Nabopolassar and the Median Cyaxares. It was maintained as a local tradition that this ancient capital of Assyria lay buried on the left bank of the Tigris opposite Mosul; but the fact was not definitely settled until in 1841 M. Botta began excavations in the vast mounds which there existed. He was followed in this by Mr. (afterwards Sir Henry) Layard, who explored a great portion of the large angle formed by the Tigris and the Zab. In the mounds of Koyunjik opposite Mosul he excavated the palaces of Sennacherib, Assurbanipal, and Esarhaddon. The walls of the city, which the inscriptions describe as Ninua, stretch along the Tigris for 2½ miles,

and the elaborate outworks, moats, and defences can still be traced. The important discoveries made by Layard were continued by Loftus, Hormuzd Rassam, and G. Smith, and the result of their labours deposited in the British Museum. See *Assyria.*

Ningpo, a large city of China, in the province of Che-kiang, one of the ports open to foreign commerce, on a plain on the left bank of the Takia or Nîng-po river, about 16 miles from its mouth. It is surrounded by a wall 25 feet high, 15 feet wide, and 5 miles in circuit, and its most remarkable edifice is the great Ning-po pagoda, 160 feet in height, and now partly in ruins. The manufactures consist chiefly of silk and cotton goods, carpets, furniture, &c. The principal exports are tea, silk, and raw cotton; and the principal imports, sugar and opium. Pop. 240,000.

Ninian, St., a missionary preacher who spread Christianity among the Picts in the beginning of the 4th century. He was ordained bishop of the Southern Picts by Pope Siricius in 394. Ninian selected Candida Casa, or Whithorn (Wigtownshire), as his chief seat, but prosecuted his labours in all parts of southern Scotland, and even as far north as the Grampians. He died in 432. His festival is the 16th September.

Ninon de L'Enclos. See *L'Enclos.*

Ninus, the fabulous founder of the Assyrian Empire, and of its capital Nineveh. He married Semiramis, by whom he was afterwards murdered.

Ni'obē, in Greek mythology, the daughter of Tantalus, married to Amphion, king of Thebes. Proud of her numerous progeny, she provoked the anger of Apollo and Artemis (Diana), by boasting over their mother Leto (Latona), who had no other children but those two. She was punished by having all her children put to death by those two deities. She herself was metamorphosed by Zeus (Jupiter) into a stone which shed tears during the summer. This fable has afforded a subject for art, and has given rise to the beautiful group in the tribune at Florence, known by the name of Niobē and her Children.

Nio'bium, or Columbium, a rare metal discovered in 1801 in a black mineral called columbite from North America. It forms a black powder insoluble in nitric acid, but readily soluble in a mixture of nitric and hydrofluoric acids. Symbol Nb. Atomic weight 98.

Niort (ni-ōr), a town in Western France, capital of the department of Deux-Sèvres, on two hills washed by the Sèvre-Niortaise, 79 miles south-east of Nantes. Its town-house and old castle are interesting buildings. The staple manufactures are leather and gloves, and the trade, particularly in claret, is extensive. Pop. 19,749.

Nipa, a genus of palms of which there is but one species, *N. fruticans,* a native of the East Indies, Philippines, &c., growing on marshy coasts. It has no stem, fronds about 20 feet long, and edible fruits. The fronds are used for a variety of purposes.

Niphon, or Nipon. See *Japan.*

Nip'igon, or Nep'igon, a lake of Canada, in Ontario, about 30 miles north-west of Lake Superior. It is about 70 miles long and 40 miles broad, with rugged headlands, deep bays, and many islands. It is connected with Lake Superior by the Nipigon river.

Nipis'sing, Lake, a lake of Canada, in Ontario, N.E. of Lake Huron, irregular in coast-line; breadth, about 30 miles; length, 48 miles. It contains numerous islands, and finds its only outlet by French River into Lake Huron.

Nipple. See *Mammary Glands.*

Nipplewort, a plant of the genus *Lapsăna* (*L. communis*), nat. order Compositæ, growing commonly as a weed by the sides of ditches and in waste places.

Nirva'na. See *Buddhism.*

Nisâmî, full name Abu Mohammed Ben Jusuf Sheikh Nisâm-ed-Dîn, one of the great poets of Persia, and the founder of the romantic epic, born about 1100 A.D., was a special favourite of the Seljuk princes, who then ruled in Persia; died in 1180. Besides a Divan, or collection of lyrics, he wrote five larger poems, which have been extensively circulated in Persia and India.

Ni'san, a month of the Jewish calendar, the first month of the sacred year and seventh of the civil year, answering nearly to our March. It was originally called Abib, but began to be called Nisan after the captivity.

Nish, or Nissa, a fortified town in Servia, on the Nishava, 130 miles S.E. of Belgrade. It is the seat of a Greek bishop, and has celebrated hot springs and baths. It was the native place of the Emperor Constantine the Great. Pop. 12,800.

Nish'apur, an ancient city in Persia, province of Khorasan, 50 miles west by south of Mushed. Turquoises of excellent quality have long been found in its vicinity. Omar Khayyam was born here in 1123. Pop. about 15,000.

Nis'ibis, anciently a famous town in Mesopotamia, on the river Mygdonius. It is now called Nisibin, and is a small ruinous place.

Nisi prius, a law phrase meaning 'unless before,' and occurring originally in a writ by which the sheriff of a county was commanded to bring the men impannelled as jurors in a civil action to the court at Westminster on a certain day, 'unless before' that day the justices came thither (that is, to the county in question) to hold the assizes, which they were always sure to do. The judges of assize, by virtue of their commission of *nisi prius*, try the civil causes thus appointed in their several circuits, being said to sit at *nisi prius*, and the courts in which these actions are tried being called courts of *nisi prius*, or *nisi prius* courts. A trial at *nisi prius* may be defined in general as a trial, before a judge and jury, of a civil action which has been brought in one of the superior courts. The phrase has the same meaning in the United States.

Nitrate, a salt of nitric acid. The nitrates are generally soluble in water, and easily decomposed by heat. Deposits of nitrates are present in small quantities in almost all soils, but enormous accumulations exist in Chili and Peru. These latter deposits, which are known as Chili saltpetre, cubic nitre, or nitrate of soda, are found near the coast, and are probably produced from remains of marine animals and birds. The great value of this nitrate is in its application to agriculture as a fertilizer on impoverished soil; for it is now well known that crops require large quantities of nitrogen to secure their full development. It has been found by experiment, for instance, that with a soil poor in nitrogen the crop of wheat per acre was 2090 lbs., whereas when the same soil was dressed with nitrogenous manure, the return was 6982 lbs. So also with potatoes, the poor soil yielded 4452 lbs. as compared with 17,192 lbs. when dressed with nitrate. The nitrates, of which nitrate of soda is now considered the best, should not be used on light porous soils where the rain will sink the manure below the range of the roots. They make an excellent top-dressing in the spring, especially for root-crops. See also *Cubic Nitre*.

Nitrate of Silver, a substance obtained by cooling, in the shape of tabular crystals, from the solution produced when silver is oxidized and dissolved by nitric acid diluted with two or three times its weight of water. When fused the nitrate is of a black colour, and it may be cast into small sticks in a mould; these sticks form the *lunar caustic* employed by surgeons as a cautery. It is sometimes employed for giving a black colour to the hair, and is the basis of the indelible ink for marking linen. Its solution is always kept in the laboratory as a test for chlorine and hydrochloric acid.

Nitrate of Soda, a salt analogous in its chemical properties to nitrate of potash or nitre. It is largely used as a manure, and as a source of nitric acid and nitre. See *Nitrate*.

Nitre (KNO_3), a salt, called also saltpetre, and in the nomenclature of chemistry nitrate of potassium or potassic nitrate. It is produced by the action of microbes in soils containing potash and nitrogenous organic matters, and forms an efflorescence upon the surface in several parts of the world, and especially in the East Indies, whence much nitre is derived. In some parts of Europe it is prepared artificially from a mixture of common mould or porous calcareous earth with animal and vegetable remains containing nitrogen. It is also manufactured on a large scale by crystallization from a hot solution of chloride of potassium and nitrate of soda. It is a colourless salt with a saline taste, and crystallizes in six-sided prisms. It is employed in chemistry as an oxidizing agent and in the formation of nitric acid. Its chief use in the arts is in the making of gunpowder. It also enters into the composition of fluxes, and is extensively employed in metallurgy; it is used in the art of dyeing, and is much employed in the preservation of meat and animal matters in general. In medicine it is prescribed as cooling, febrifuge, and diuretic. — *Cubic nitre*. See *Nitrate*.

Nitric Acid (HNO_3), the most important of the five compounds formed by oxygen with nitrogen. When pure it is a colourless liquid, very strong and disagreeable to the smell, and so acrid that it cannot be safely tasted without being much diluted. It is known in the arts as *aqua fortis*, and is commonly obtained by distilling nitre (potassium nitrate) or Chili saltpetre (sodium nitrate) with strong sulphuric acid. Nitric acid contains about 76 per cent of oxygen, a great part of which it readily gives up to other substances, acting thus as a powerful oxidizer. Thus many metals—such as copper, tin, silver, &c.—when brought into contact with this acid are oxidized at the expense of the acid with the production of lower oxides

of nitrogen and an oxygenated metallic salt. Nitric acid, when moderately dilute, acts on organic bodies so as to produce a series of most useful substances, notably acetic, oxalic, and picric acids, isatin or white indigo, &c. When strong acid is used, nitro-compounds oftentimes result, containing the group NO_2 in place of part of the hydrogen of the original substance; thus we get *nitrophenol*, *nitrobenzol*, &c. By replacement of the hydrogen in nitric acid a series of salts termed *nitrates* is obtained. (See *Nitrate*.) When nitrates are heated with combustible bodies an explosion is generally produced. A mixture of strong hydrochloric and nitric acids is known as *aqua regia*, *nitromuriatic*, or *nitrohydrochloric acid*. Nitric acid is employed in etching on steel or copper; as a solvent of tin to form with that metal a mordant for some of the finest dyes; in metallurgy and assaying; also in medicine, in a diluted state, as a tonic and as a substitute for mercurial preparations in syphilis and affections of the liver; and also in form of vapour to destroy contagion.

Nitrides, a general designation for the compounds of nitrogen with other elements or radicles, but more especially for those compounds which nitrogen forms with phosphorus, boron, silicon, and the metals.

Nitrites. See *Nitrogen*.

Nitro-benzol ($C_6H_5NO_2$), a liquid prepared by adding benzol drop by drop to fuming nitric acid. It closely resembles oil of bitter almonds in flavour, and is largely employed as a substitute for that oil in the manufacture of confectionery and in the preparation of perfumery. It is important as a source of aniline.

Nitro-compounds, compounds of carbon which are formed from others by the substitution of the monatomic radicle NO_2 for hydrogen.

Nitrogen, an important elementary principle, the basis of nitric acid and the principal ingredient of atmospheric air. Its symbol is N, its equivalent 14, and its specific gravity 0·9713. It is a colourless, invisible gas, called by Lavoisier *azote* (Greek, *a*, privative, *zōē*, life), because it is incapable of supporting life. The name nitrogen was applied to it by Chaptal, because of its entering into the composition of nitre, nitric acid, &c. The atmosphere contains about four-fifths of its volume of nitrogen, the rest being principally oxygen; nitre contains nearly 13 per cent, and nitric acid about 22 per cent by weight of this substance. Nitrogen is inodorous, tasteless, incombustible, and a very inert substance in itself, although many of its compounds, such as nitric acid and ammonia, are possessed of great chemical activity. By reason of its inertness and general slowness of chemical action it acts the part of a diluent of oxygen in the atmosphere. Having no marked action of its own on living beings, its admixture with the oxygen of the air serves to moderate the otherwise too violent action of the latter gas. Under certain circumstances nitrogen may be induced to combine with other elements, especially with hydrogen, oxygen, and carbon, with titanium, tantalum, and tungsten. Nitrogen is allied in many of its chemical properties to the other elementary substances—phosphorus, arsenic, antimony, and bismuth; and it has the power of combining with one, three, or five atoms of a monovalent element or radicle. The oxides of nitrogen are five in number. The first oxide of nitrogen (nitrogen *monoxide*) contains 28 parts by weight of nitrogen united with 16 parts by weight of oxygen; its chemical formula is N_2O. The next oxide (*dioxide*) contains 28 parts by weight of nitrogen united with 32 parts by weight of oxygen; its formula is N_2O_2. In the third oxide (*trioxide*) 28 parts of nitrogen is united with 48 parts of oxygen, and to it the formula N_2O_3 is assigned; while the fourth and fifth oxides (*tetroxide, pentoxide*) contain respectively 64 and 80 parts of oxygen, united in each case with 28 of nitrogen; to these the formulæ N_2O_4 and N_2O_5 are given. These oxides may be all produced from nitric acid. The *trioxide* forms a dark-blue liquid, which, when added to water at 0°, combines therewith, forming *nitrous acid*, HNO_2. This solution acts as a reducing agent, inasmuch as it eliminates gold and mercury as metals from several of their salts; on the other hand, it also exercises an oxidizing action on such salts as ferrous sulphate, potassium iodide, &c. By replacement of the hydrogen in nitrous acid a series of metallic salts is obtained, called *nitrites*. Nitrogen monoxide is better known by the name of 'laughing-gas,' from the peculiarly exhilarating effect which it produces when breathed along with a little air. If the gas be pure, its inspiration soon brings about total insensibility, which does not continue long, and generally produces no bad effects upon the person who breathes it; hence it is much used as an anæsthetic in minor surgical operations, such as teeth-drawing, &c.

Nitro-glycerine, an explosive substance appearing as a colourless or yellowish oily liquid, heavier than and insoluble in water, but dissolved by alcohol, ether, &c. It may be prepared by adding to 350 parts by weight of glycerine 2800 parts by weight of a cooled mixture of 3 parts of sulphuric acid of 1·845 specific gravity and 1 part of fuming nitric acid. The liquid is poured into ten or twenty times its bulk of cold water, when the heavy nitro-glycerine sinks to the bottom. When violently struck nitro-glycerine explodes, being resolved into water, carbonic acid, nitrogen oxides, and nitrogen. The volume of gas produced is about 10,000 times the initial volume of the nitro-glycerine. Explosion can also be effected by heating to about 500° F. one portion of a mass, whereby partial decomposition is set agoing which almost immediately propagates itself throughout the liquid. The explosive force of nitro-glycerine compared with that of an equal volume of gunpowder is as 13 : 1. If any traces of acid be allowed to remain in nitro-glycerine it is liable to undergo spontaneous explosion; hence it is an exceedingly dangerous article to transport or store under such conditions. It is advisable to prepare the substance on the spot where it is to be used, and only in such quantities as may be required for immediate consumption. This method is adopted in many quarries and engineering undertakings, especially in America. Nitro-glycerine has for some time been used in the form of *dynamite*, to produce which it is mixed with some light absorbent substance. See *Dynamite*.

Nitromuriatic Acid. See *Nitric Acid*.

Nitrous Acid. See *Nitrogen*.

Nitrous Oxide. See *Nitrogen*.

Nivelles (ni-vell; Flemish, *Nyvel*), a town of Belgium, prov. Brabant, on the Thines, 18 miles south of Brussels, which has manufactures of woollen, cotton, linen, and paper, as well as railway locomotive and carriage works. The church of St. Gertrude is an edifice in the Romanesque style. Pop. 10,788.

Nivernais (ni-ver-nā), formerly one of the provinces of France, corresponding nearly to the present department of Nièvre.

Nivose (nē-vōz; literally 'snow-month'), the name given in the French revolutionary calendar to a winter month beginning December 21 and ending January 19.

Nix, or NIXIE, in German popular mythology, the name of water spirits (male and female), haunting rivers, brooks, ponds, and lakes. The male nixie is sometimes represented as old, sometimes as young, but generally as a malicious being. The female nixie appears as a blooming maiden, who often falls in love with some young man, whom she entices or draws into the water.

Nixdorf, a town in northern Bohemia, with manufactures of cutlery, tools, and other steel wares, fancy goods, &c. Pop. 6449.

Nizam', in the East Indies, the title of the ruler of Hyderabad in the Deccan, derived from *Nizam-ul-mulk*, governor or regulator of the state, a name adopted by Azof Jah in 1719, and since that time adopted by his successors.

Nizam's Dominions. See *Hyderabad*.

Nizza. See *Nice*.

Noah, one of the patriarchs of the Old Testament, son of Lamech, is described in the book of Genesis as being chosen by God for his piety to be the father of the new race of men which should people the earth after the deluge. Having been warned by God of the coming flood, he built a vessel (the *ark*) by his direction, and entered it with his family and all kinds of animals. (See *Deluge*.) After the waters had subsided the ark rested on Mount Ararat, where Noah offered a thank-offering to God, and was assured that the earth should never again be destroyed by a flood, as sign whereof God set the rainbow in the clouds. Noah died at the age of 950 years, 350 years after the flood. While modern accounts place Mount Ararat in Armenia, older traditions locate it in the mountains of the Kurds, east of the Tigris.

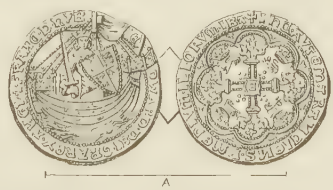
Noailles (no-āy), one of the oldest noble families in France. Among the most distinguished of the family was ADRIEN MAURICE, Duke of Noailles, born 1678, died 1766. He served in Spain in the Spanish war of Succession, was created grandee of Spain, and in 1698 married a niece of Madame de Maintenon. During the minority of Louis XV. he was president of the council of finance and member of the council of regency, which he left, however, in 1721, rather than concede the presidency to Cardinal Dubois. Exiled by the influence of Dubois, he was, on his death, recalled and reinstated in his former offices. In 1734 he served under Berwick on the Rhine, and at the siege of Philipsburg received the marshal's staff. In 1735 he commanded the French army in Italy. During the Austrian war of Succession he held a command on the Rhine; and in 1743, through the impetuosity of his nephew the Count of Grammont, he lost the battle of

Dettingen. He served under Marshal Saxe at Fontenoy.—A recent member of the family was PAUL, Duke de Noailles, born 1802, died 1885. He wrote Histoire de Madame de Maintenon.—His son, EMANUEL VICTORIEN HENRI, Marquis de Noailles, born 1830, has been minister at Washington, Rome, and Constantinople.

Nobert's Test-plates, finely-ruled glass plates so named from F. Nobert, a German optician, used for testing the power of microscopes. The rulings are executed on the under surface of a piece of exceedingly thin glass by means of a diamond point. Some of these ruled plates have the almost incredible number of 225,187 spaces to the inch.

Nobility, a rank or class of society which possesses hereditary honours and privileges above the rest of the citizens. Such a class is found in the infancy of almost every nation. Its origin may be attributed to military supremacy, to the honours paid to superior ability, or to the guardians of the mysteries of religion. Among the ancient Romans the patricians originally formed the nobility; but a new order of nobility arose out of the plebeians, consisting of those who had held curule magistracies and their descendants, enjoying the right of having images of their distinguished ancestors. Among the ancient German tribes only obscure traces of hereditary nobility are found. The dignities of the counts of the Franks, the aldermen and great *thanes* of England, as also of the *jarls* (in England *eorlas*) of Denmark, were accessible to every one distinguished by merit and favoured by fortune. In Venice a civic nobility grew up consisting of a series of families who gradually acquired all political power and kept it to themselves and their descendants. In England hereditary nobility, the nobility belonging to the titles of duke, marquis, earl, viscount, and baron, is now entirely personal, though formerly, as a result of the Norman conquest, it was connected with the holding of lands. In Spain and Italy still the same rank depends in greater measure upon property; and in France and Germany the *de* and *von* of titles points to the same fact. In France and Germany nobility is common to all the members of the noble family, and the German nobility form a very exclusive caste. In France and Germany the nobles long formed a class of petty sovereigns within their own domains. The French revolution first deprived the nobles of that country of their privileges and exclusive rights, as that of jurisdiction, &c.; and the decree of June 19, 1790, abolished hereditary rank entirely. Under Napoleon I. arose a new hereditary nobility, with the titles of princes, dukes, counts, barons, and chevaliers, which descended to the eldest son. After the restoration of the Bourbons (1814) the ancient nobility reclaimed their former rights and privileges. Nobility was again abolished in 1848, but was restored by Napoleon III. In Norway the parliament abolished nobility by the three successive decrees of 1815, 1818, and 1821. In Great Britain titles of nobility can only be conferred by the sovereign, and that by patent, in virtue of which they become hereditary. Life peerages also are occasionally conferred. The nobility, as the term is commonly used, consists of those holding the titles already mentioned (or all above the rank of baronet) and their more immediate connections; but if the term were to be used as generally in Europe the gentry would also be included, or all families entitled to bear coat-armour. Those of the nobility who are peers of England, of Great Britain, or of the United Kingdom, have a hereditary seat in the House of Lords, while the Scottish peers elect sixteen of their number to represent their order, and the Irish peers elect twenty-eight representatives for the same purpose. See also *Britain* (sections *Parliament* and *Ranks and Titles*), *Peerage*.

Noble, an ancient English gold coin, value six shillings and eightpence, first struck in the reign of Edward III., 1344. The noble



Noble of Edward III. A, Actual diameter of the coin.

having increased in value to 10s., a coin of the former value of a noble was issued by Henry VI. and Edward IV., and called an *Angel* (which see). Half-nobles and quarter-nobles were also in circulation at the same period.

Nocera (nō-chā'rà), a cathedral city of South Italy, province Salerno; it carries on cotton-spinning and weaving. Pop. 12,522.

Noctilu'ca, a minute genus of marine animals placed among the Infusoria or the Rhi-

zopoda, which in size and appearance much resemble a grain of boiled sago, or a little granule of jelly, with a long stalk. These minute animals are phosphorescent; and the luminosity which appears at the surface of the sea during the night is chiefly due to them.

Nocturne (nok-tèrn'), in painting, a night-piece; a painting exhibiting some of the characteristic effects of night light. In music, a composition in which the emotions, particularly those of love and tenderness, are developed. The nocturne has become a favourite style of composition with modern pianoforte composers.

Noddy (*Anŏus stolidus*), a sea-bird of the family Laridæ (gulls), widely diffused through the northern and southern hemispheres, and well known to sailors for its fearlessness or stupidity, allowing itself even to be taken by the hand; hence its name. The noddy is an unfrequent visitant to our shores; but is very abundant in warmer climates, as in the West Indies. There are several other species differing somewhat in details from *A. stolidus*.

Node, in astronomy, one of the points in which two great circles of the celestial sphere, such as the ecliptic and equator, the orbits of the planets and the ecliptic, intersect each other; and also one of the points in which the orbit of a satellite intersects the plane of the orbit of its primary. The node at which a heavenly body passes or appears to pass to the north of the plane of the orbit or great circle with which its own orbit or apparent orbit is compared is called the *ascending node;* that where it descends to the south is called the *descending node.* At the vernal equinox the sun is in its ascending node, at the autumnal equinox in its descending node. The straight line joining the nodes is called the *line of the nodes.* The *lunar nodes* are the points at which the orbit of the moon cuts the ecliptic.

Node, in physics, a point in a vibrating body, or system of vibrating particles, where there is no movement. When a body is vibrating, the vibratory motion is conveyed from one place to another by the action of the molecular forces of the particles on one another. Now when all the forces acting on a certain particle are at any instant in equilibrium, and the particle consequently remains at rest, there is said to be a *node* at the particle. If a plate of glass or metal be held in the hand, and a bow be drawn across the edge, particles of fine sand, previously placed on the plate, will arrange themselves in lines, along which it is evident no vibration has taken place. These lines, called *nodal lines*, generally form geometrical figures.

Nodier (nod-i-ā), CHARLES, a versatile French writer, born 1780, died 1844. At first a republican, then an ardent royalist, he lived an adventurous life till 1824, when he became librarian to the Bibliothèque de l'Arsenal. He wrote tales, romances, satires, dictionaries, travels, works on entomology, &c., was a friend of all the literary men of the time, and had a certain influence on the Romantic school of French authors, including Hugo, Dumas, and others.

Nodosa'ria, a genus of fossil foraminifers, having a shell composed of numerous chambers arranged in a straight line. They occur in chalk, tertiary, and recent formations.

Nogent-le-rotrou (nō-zhän-lē-rō-trö), a town of Northern France, dep. Eure-et-Loir, 33 miles W.S.W. of Chartres, at the foot of a steep hill on which the old castle of Sully, Henry IV.'s minister, stands. It has manufactures of woollens and leather, &c. Pop. 6750.

Nogent-sur-Marne, a suburban village of Paris on the Marne, a little to the east of the capital. Pop. 12,000.

Noirmoutier (nwâr-mö-tyā), an island of North-western France, separated from the coast of Vendée by a narrow and shallow channel. It is about 10 miles long, with a breadth varying from 1 to 3 miles, and is generally fertile. Pop. 7890. The chief town, of the same name, has good anchorage and a productive oyster-fishery. Pop. 2085.

Noisseville (nwàs-vēl), a village of German Lorraine to the east of Metz, the scene of a fiercely-contested battle during the Franco-German war, 31st Aug. and 1st Sept. 1870, between the forces of Prince Frederick Charles and those of Marshal Bazaine.

Nola, a town of S. Italy, and a bishop's see, near Naples, in Caserta, said to have been built by the Etrurians before Rome, was once a flourishing Roman colony, and is yet a handsome town. Bells are said to have been first made here. Pop. 7496.

Noli-me-tangere (Lat. 'touch me not'), name of a plant. See *Impatiens.*

Nol'lekens, JOSEPH, an English sculptor, son of an Antwerp painter, born in London 1737, died 1823. He was placed early under Scheemakers, and in 1759 and 1760 gained premiums from the Society of Arts. Going subsequently to Rome, he had the

honour of receiving a gold medal from the Academy of Painting and Sculpture. On his return to England in 1770 he was elected an Associate of the Royal Academy (1771) and a Royal Academician (1772). His Venus with the Sandal is his principal ideal production; but his professional reputation rests mainly upon his portrait busts.

Nolle Prosequi (nol'le pros'e-kwī; Lat. 'to be unwilling to prosecute'), in law, a stoppage of proceedings by a plaintiff, an acknowledgment that he has no cause of action.

Nomads, tribes without fixed habitations, generally engaged in the tending and raising of cattle, and changing their abode as necessity requires or inclination prompts. North Africa, the interior of North and South America, and the northern and middle parts of Asia, are still inhabited by nomadic tribes, some of whom are little better than bands of robbers.

Nombre de Dios, a town in the state of Durango, Mexico, with rich silver-mines in the vicinity. Pop. 5000.

Nominalism, the doctrines of those scholastic philosophers who followed John Roscellin, canon of Compiègne in the 11th century, in maintaining that general notions (such as the notion of a tree) have no realities corresponding to them, and have no existence but as names (*nomina*) or words. They were opposed by the *realists*, who maintained that general ideas are not formed by the understanding, but have a real existence independent of the mind and apart from the individual object. During the 12th century the controversy between the nominalists and the realists was carried on with great keenness, and in the beginning of the 14th the dispute was revived by the English Franciscan William of Occam, a disciple of the famous Duns Scotus. The controversy gave rise to actual persecution and cruelty.

Nominative Case, in grammar, that form of a noun or pronoun which is used when the noun or pronoun is the subject of a sentence.

Non-activity. See *Neutrality.*

Non-commissioned Officer, one who, while he is not commissioned as an officer, holds an appointment by virtue of which he exercises authority over the private soldiers. Such are sergeant-majors, quartermaster-sergeants and sergeants.

Non Compos Mentis ('not of sound mind'), an expression used of a person who is not of sound understanding, and therefore not legally responsible for his acts.

Nonconformists, those who refuse to conform to an established church. The name was first applied to those English clergymen who, at the Restoration, refused to subscribe to the Act of Uniformity, and were in consequence ejected from their livings. Relief was afforded by the Toleration Act of 1689. The repeal of the Corporation and Test Acts in 1828 removed the civil disabilities under which Nonconformists had previously been placed, and religious tests at the universities were abolished in 1871 and 1873. See *England* (*Ecclesiastical History*).

Non-effective, the term applied in military language to designate that portion of the forces not in active service or not in a condition to proceed to active service, such as retired officers, pensioners, and the like.

Nones, (1) in the Roman calendar, the fifth day of the months January, February, April, June, August, September, November, and December, and the seventh day of March, May, July, and October. The *nones* were so called as falling on the *ninth* day before the ides, both days included. (2) The office for the ninth hour, one of the breviary offices of the R. Catholic Church.

Nonjurors, those who refused to take the oath of allegiance to the government and crown of England at the Revolution, when James II. abandoned the throne. See *England* (*Ecclesiastical History*).

Nonnus, or NONNOS, a later Greek poet, born at Panopolis, in Egypt, who lived about the beginning of the 5th century A.D. He is the author of a poem entitled Dionysiaca, in forty-eight books, in which the expedition of Bacchus (Dionysus) to India is described; also of a paraphrase, in Greek hexameters, of the Gospel of St. John.

Non-residence, failure or neglect of residing where official duties require one to reside, or on one's own lands; especially residence by clergymen away from their cures. A beneficed clergyman of the English Church absenting himself without license from his bishop for more than three months in any year is liable to forfeit part of his emoluments.

Non-resistance, submission to authority, power, or usurpation without opposition. This used to be inculcated by the believers in the doctrine of the divine right (which see) of kings.

Nonsuit, a term in law. When a person has commenced an action, and at the trial fails in his evidence to support it, or has brought a wrong action, he is nonsuited.

A nonsuited plaintiff may afterwards bring another action for the same cause, which he cannot do after a verdict against him.

Nootka, an island of Canada on the west coast of Vancouver Island, at the entrance of Nootka Sound, an inlet running about 10 miles inland.

Nootka-dog, a large variety of dog domesticated by the Indians of Nootka Sound, chiefly remarkable for its long wool-like hair, which when shorn off holds together like a fleece, and is made into garments.

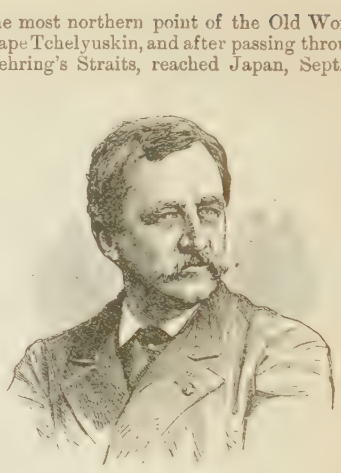
Noraghe (no-rä'gā). See *Nuraghi*.

Nord, a department in the north-east of France, bordering with Belgium; area, 2170 square miles. The coast, marked by a long chain of sandy hillocks, furnishes the two harbours of Dunkirk and Gravelines. The interior is a monotonous but fertile alluvial flat, intersected by sluggish streams and canals. The husbandry, nearly akin to that of Flanders, is careful, skilful, and productive. The principal minerals are coal and iron, which are extensively wrought; and the occupations connected with or depending on them render this department among the most important in France. The capital is Lille. Pop. 1891, 1,736,341.

Norden, a seaport of Prussia, in Hanover, 16 miles north of Emden, on a canal which at a short distance communicates with the sea. Pop. 6617.

Nordenfeldt, a Swedish engineer, born 1844, the inventor of a machine-gun which bears his name, also of several torpedoes and a submarine boat.

Nordenskiöld (nor'den-sh*ould*), Nils Adolf Erik, Baron, a Swedish naturalist and explorer, born at Helsingsfors Nov. 18, 1832. He devoted himself to science, and was appointed to some important posts, but becoming obnoxious to the Russian authorities he settled in Sweden. In 1851 he went with an expedition to Spitzbergen, to which he several times returned, assisting in the measurement of an arc of the meridian and mapping the southern part of Spitzbergen. On a North Polar expedition in 1868 Nordenskiöld reached the high latitude of 81° 42′. Having turned his attention to Siberia, after making two successful voyages through the Kara Sea to the Yenissei, he decided to attempt the accomplishment of the north-east passage, or passage by sea round Northern Asia to the Pacific. Aided by the King of Sweden and others, Nordenskiöld was enabled, July 1878, to sail in the *Vega*, which was the first vessel to double the most northern point of the Old World, Cape Tchelyuskin, and after passing through Behring's Straits, reached Japan, Sept. 2,



Baron Nordenskiöld.

1879. The object of the expedition being thus accomplished, Nordenskiöld was enthusiastically welcomed in Europe and created a baron by the King of Sweden.

Norderney, a small island belonging to Prussia, on the coast of East Friesland, reachable on foot at low tide; area, about 5 square miles; pop. 2842, chiefly fishermen of the old Frisian stock. At the south-west end of the island is a village famous as a sea-bathing place throughout Germany, and visited annually by some 13,000 persons.

Nordhausen (nord'hou-zn), a town in Prussian Saxony, 38 miles N.N.W. of Erfurt, pleasantly situated at the foot of the Harz Mountains. It has a Roman Catholic cathedral, a fine late Gothic edifice with a Romanesque crypt, an old town-house, &c. It manufactures woollen and linen cloth, lacquerware, chemicals, &c.; and has extensive distilleries and breweries. Pop. 27,083.

Nördlingen (neurd'ling-ėn), a walled town of Bavaria, near the Würtemberg frontier, with well-preserved walls and towers, and a handsome Gothic church, surmounted by a remarkable tower 345 feet high. Manufactures of carpets, woollen and linen goods, leather, &c. The Swedes were defeated here Sept. 6, 1634. (See *Thirty Years' War*.) Pop. 8095.

Nordstrand, an island of Prussia, on the west coast of Schleswig; area, 21 square miles. The greater part of it was swept away in 1634 by a flood, which drowned

15,000 persons. Pop. about 2500 Frisians by origin.

Nore, (1) A part of the estuary of the Thames, about 50 miles below London, and east of Sheerness, encumbered with sand-banks, on one of which is a floating light.—(2) A river of Ireland, rising in the Sliebh-bloom Mountains, on the borders of Tipperary and Queen's County, and joining the Barrow about 2 miles above New Ross; length 70 miles. It admits vessels of considerable size as far as Inistioge, and barges to Thomastown.

Norfolk (nor'fok), a county of England, bounded north and north-east by the North Sea, south and south-east by Suffolk, west and north-west by Cambridge, Lincoln, and the Wash. Area, 1,356,173 acres, of which 1,095,195 acres are arable, meadow, and pasture. The surface is generally flat, with some slight swells and depressions in the north part. The coast consists principally of cliffs, partly chalk and partly alternate strata of clay, gravel, loam, and sand. These are gradually being undermined by the sea, which is in many places making inroads on the land. Considerable areas on the coast of the Wash, however, have been reclaimed from the sea. The principal rivers are the Yare, in the east, with its affluents the Bure, the Wensum, and the Waveney; and the Ouse, in the west, with its feeders the Little Ouse, the Wissey, &c. The Yare and its tributaries expand near the sea into meres or *broads*, which, largely covered with bulrushes and sedges, are the resort of a great variety of water-fowl. This county has a high reputation for its progress in agriculture. The crop raised in greatest perfection is barley, which is its chief agricultural produce. Most of it is made into malt, and then sent elsewhere. The manufactures consist chiefly of woven goods. Norfolk has extensive fisheries of both herrings and mackerel, the former being the most important. It returns six members to parliament. The county town is Norwich; the chief seaport is Yarmouth. Pop. 456,474.

Norfolk, a city and port in the county of the same name, Virginia, U.S., on the river Elizabeth, 32 miles from the ocean. The harbour is safe and commodious, and a large trade is done in cotton. Norfolk is an important naval station. Pop. 1890, 34,871.

Norfolk, Duke of. See *Howard*.

Norfolk-crag, in geology, an English tertiary formation belonging to the older Pliocene, resting on the chalk and London-clay. It consists of irregular beds of ferruginous sand-clay, mixed with marine shells and mastodon and elephant remains.

Norfolk Island, an island in the South Pacific, about 800 miles east of New S. Wales, with which it is governmentally connected, is about 6 miles long by 4 broad, and has a fertile soil and salubrious climate, readily producing sweet-potatoes, various tropical fruits, wheat, maize, &c. The coasts are precipitous and there is no good landing-place. At one point it rises to the height of 1050 feet. The Norfolk Island pine grows to a great size, but is now comparatively scarce. Discovered uninhabited by Captain Cook in 1774, it was long used as a penal settlement connected with N. S. Wales, and in 1856 it was assigned to the Pitcairn Islanders for their residence. (See *Pitcairn Island*.) These descendants of the mutinous crew of the *Bounty* were long represented as a community living in almost primitive innocence and simplicity, but recent reports hardly bear out the rosy picture. For instance, a government official sent from New S. Wales to investigate the state of matters reports (in a blue-book of 1886): 'The whole system and everything arising from it is rotten. The whole thing is a great falsehood from John Adams' time till now. . . . It really appears to me wonderful that a small community like this should have succeeded in so completely gulling the whole world into the belief that they are an isle of saints. I believe there is more immorality of all kinds here, according to the population, than in any other part of the civilized world.' They are described as lazy and shiftless, cultivation being carried on in a very neglectful manner. Their numbers amounted in 1885 to 481, not including the members of the mission station founded in 1867 and carried on under the Bishop of Melanesia. This station is intended as a centre from which Christianity may be propagated in the Pacific; it has a farm of 1000 acres and educates about 150 Polynesian boys and girls besides native pastors.

Norfolk Island Pine, a tree of the genus *Araucaria* (*A. excelsa*), nat. order Coniferæ, formerly abounding on Norfolk Island, where it attains a height of 200 feet or more, with a diameter of 10 or 11 feet. Its timber is valuable, being white, tough, and close-grained. It does not thrive in the open air in Britain, but grows remarkably well in conservatories, and is one of the most beautiful of trees. Though an *Araucaria* it

is very unlike the common species (*A imbricāta*).

Noria, a hydraulic machine used in Spain, Syria, Egypt, and other countries for raising water. It consists of a water-wheel with revolving buckets or earthen pitchers, like the Persian wheel, but its modes of construction and operation are various. As used in Egypt it is known as the *sakieh*. These machines are generally worked by animal power, though in some countries they are driven by the current of a stream acting on floats or paddles attached to the rim of the wheel.

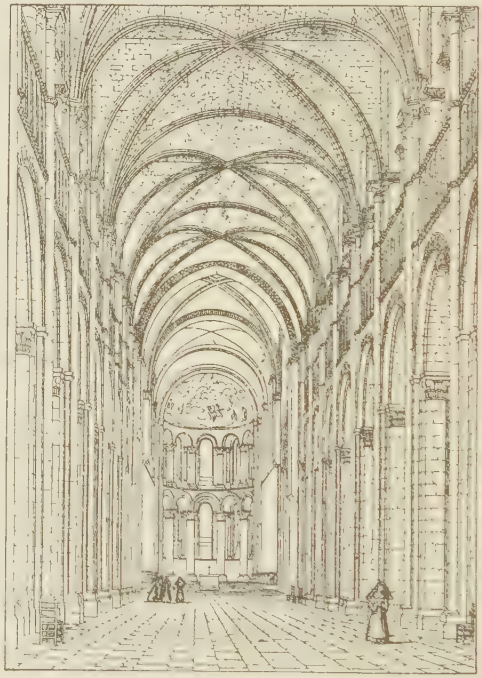
Noric Alps. See *Alps*.

Nor'icum, among the Romans, a region that corresponded nearly to what is now Upper and Lower Austria and Styria.

Normal, in geometry, a perpendicular; the straight line drawn from any point in a curve at right angles to the tangent at that point; or the straight line drawn from any point in a surface, at right angles to the tangent plane at that point.

Normal Schools, called also TRAINING COLLEGES, schools in which teachers are instructed in the principles of their profession and trained in the practice of it. The name is derived from the French *écoles normales*, established at the close of last century. These schools are now numerous in all countries that have a well-organized system of education. They may be either for teachers in elementary schools or for those of the secondary schools, and may be for males or females only or for both combined. In the United States the normal school is a part of the system of public-school education.

Norman Architecture, the round-arched style of architecture, a variety of the Romanesque, introduced at the Norman Conquest from France into Britain, where it prevailed till the end of the 12th century. In its earlier stages it is plain and massive with but few mouldings, and those principally confined to small features; as the style advanced greater lightness and enrichment were introduced, and some of the later examples are highly enriched. The chevron, billet, nail-head, and lozenge mouldings are distinctively characteristic of this style. The more specific characteristics of churches in this style are: cruciform plan with apse and apsidal chapels, the tower rising from the intersection of nave and transept; semi-cylindrical vaulting; the doorways, deeply recessed, with highly decorated mouldings; the windows small, round-headed, placed high in the wall, and opening with a wide splay inside; piers massive, generally cylindrical or octagonal, and sometimes enriched with shafts; capitals cushion-shaped, sometimes plain, more frequently enriched; buttresses broad, with but small projection; walls frequently decorated by bands of arcades with single or interlacing arches. In course of time the arches began to assume



Norman Architecture.—Abbaye aux Dames, Caen.

the pointed character; the piers, walls, &c., to be less massive; short pyramidal spires crown the towers; and altogether the style assumes a more delicate and refined character, passing gradually into the Early English. Besides ecclesiastical buildings, the Normans reared many castellated structures, the best remaining specimen of which is the Keep of the Tower of London. The Norman architects were not distinguished for science in construction. The walls of their buildings were of great thickness, and the piers supporting their arches were usually of immense girth, yet notwithstanding this massiveness their works frequently gave way. The Abbaye aux Hommes and the Abbaye aux Dames at Caen, Normandy, afford excellent examples of this style; as also parts of the cathedrals of Durham, Peterborough, Norwich, and Canterbury, as well as many smaller churches.

Norman Conquest, in English history, the successful attempt made by William of Normandy in 1066 to secure the English crown from his rival Harold, son of Earl Godwin. It was no real conquest of the land and people by an alien race, but rather resembled in its chief characteristics the accession of William of Orange to the throne in 1688. See *England* (*History*).

Nor'mandy, an ancient province in the north of France, now divided into the departments of Seine-Inférieure, Eure, Orne, Calvados, and Manche. On the decline of the Roman Empire it was seized by the Franks, and afterwards, in the 10th century, wrested from them by the Normans or Northmen, from whom it received its name. (See *Northmen.*) Charles the Simple gave his sanction to the conquest made by the Normans, and Rollo, their chief, received the title of Duke of Normandy. William the Bastard, sixth in succession from Rollo, having become king of England in 1066, Normandy became annexed thereto. On the death of William it was separated from England and ruled by his son Robert, and was afterwards ruled by the kings of England until Philip Augustus wrested it from John and united it to France in 1203. Although several times invaded by the English, it was finally recovered by the French in 1450. Normandy is one of the richest and most fertile parts of France.

Norman French, a dialect of old French which became the Anglo-Norman of England. It was the language of legal procedure in England till the time of Edward III., and is still used in several formal proceedings of state.

Normans (literally 'north-men'), the descendants of the Northmen who established themselves in Northern France, hence called Normandy. Besides the important place occupied in history by the Normans in Normandy and England, bands of Normans established themselves in S. Italy and Sicily, and Norman princes ruled there from the middle of the 11th till the end of the 12th century. See *Normandy* and *Northmen*, also *Guiscard*.

Nor'manton, a township in the West Riding of Yorkshire, on the Calder, giving name to a parliamentary division of Yorkshire. Pop. 1891, 10,234.

Norns, in Scandinavian mythology, the three Fates, representing the *past*, the *present*, and the *future*, whose decrees were irrevocable. They were represented as three young women, named respectively Urd, Verdandi, and Skuld.

Norris, EDWIN, an eminent English linguist, and one of the founders of Assyriology; born 1795, died 1872. For more than twenty-five years he was secretary to the Asiatic Society, and became a great authority on cuneiform writing. His great work is his Assyrian Dictionary (1868–72), which marks an epoch in cuneiform studies. The Celtic dialects also received a share of his attention.

Norristown, a city, United States, Pennsylvania, on the Schuylkill, 16 miles N.W of Philadelphia. It has extensive woollen and cotton factories, rolling-mills, foundries, &c. Pop. 1890, 19,791.

Norrköping (nor-cheup'ing), a town of Sweden, at the mouth of the Motala Elf in the Bravik, a gulf of the Baltic. The Motala Elf flows through the town, making several falls within it, and is crossed by several bridges. It has manufactures of woollens, cottons, &c., and has sugar-refineries and ship-building yards. Pop. 1891, 33,431.

Norse, the language of Scandinavia. *Old Norse* is represented by the classical Icelandic, and still with wonderful purity by modern Icelandic. The literature includes the early literature of the people of Norway, Sweden, and Iceland.

Norte (nor'tā), RIO GRANDE DEL, a river of Mexico, rising in the Rocky Mountains and emptying itself into the Gulf of Mexico. Its mouth is 1200 feet wide, but is barred so as to afford entrance only to boats. Length about 2000 miles.

North, one of the cardinal points, being that point of the horizon or of the heavens which is exactly in the direction of the North Pole. See *Pole.*

North, CHRISTOPHER. See *Wilson, John.*

North, FREDERICK, LORD, Earl of Guildford, the eldest son of Francis, second earl of Guildford, born in 1732, died 1792. He belongs to English history as chief of the administration during the American war of Independence. Obtaining a seat in the House of Commons he was, in 1759, appointed a commissioner of the treasury, but resigned in 1765, when he joined the opposition to the Rockingham ministry. He came into office again with the Grafton ministry, 1766; in 1767 became chancellor of the exchequer; and in 1770 succeeded the Duke of Grafton as minister, when his retention of the tea-duty, imposed upon the American colonists, led to the rising in America, and to the declaration of independence, 4th July, 1776. Lord North resigned on the 20th of March, 1782. He became Earl of Guildford by the death of his father in 1790.

North Adams, a city of the United States, Berkshire county, Massachusetts, on the Hoosac River, near the west end of the great Hoosac Tunnel; has manufactures of cotton and woollen goods, boots, shoes, paper, and nitro-glycerine. Pop. 1890, 16,074.

Northallerton, a town of England, Yorkshire, in the North Riding, 32 miles N.N.E. of York. The inhabitants are chiefly engaged in agriculture, and some tanning and currying are carried on. Pop. 5445.

North America, the northern half of the western continent, or New World. Under *America* a general description of N. America has been given, more especially as compared and contrasted with S. America, but some additional information may here be given.

Physical Features.—The mainland of N. America, in the widest sense of the name, is united to S. America by the Isthmus of Panamá, and extends from lat. 7° N. to lat. 72 N. In a narrower sense, and excluding the southern portion often spoken of as Central America, it extends only from lat. 15° N. To it on the north belongs an extensive archipelago of arctic islands, to the northeast of which lies Greenland, the latter generally regarded as belonging to America. The figure of N. America is very irregular, and in that respect it resembles Europe. On the north is the great indentation of Hudson Bay, almost an inland sea, connected with the Atlantic by Hudson Strait. On the east are the Gulf of St. Lawrence, with the island of Newfoundland and the peninsula of Nova Scotia at its entrance; and the Gulf of Mexico, having on one side of its entrance the peninsula of Florida, on the other that of Yucatan. From the entrance of the gulf stretch eastward Cuba and others of the West India Islands. The chief features of the Pacific coast are the Gulf of California and peninsula of Lower California—further north Vancouver Island and the chain of other islands lining the coast. The continent terminates in a peninsular extension forming Alaska Territory separated from Asia by Behring's Sea and Strait, the latter about 50 miles wide. The area of N. America (excluding Greenland but including the West Indies) is about 8,150,000 sq. miles, or considerably more than double that of Europe. As regards its surface and physical features generally it presents various points of similarity with Europe—numerous large rivers, elevated mountain chains, and large plains suited for the growth of cereals and other crops; but most of its physical peculiarities are on a scale of greater magnitude than those of Europe. Thus its greatest mountain system, that of the Cordilleras (of which the Rocky Mountains strictly speaking form only a part), extends along the entire western side of the continent for a distance of at least 5000 miles, and rises to the height of 20,000 feet; the great plains which stretch on the east of these mountains from the Arctic Ocean to the Gulf of Mexico are also of far greater magnitude than those of Europe, contain the largest bodies of fresh water in the world, and are intersected by a series of rivers, one of which, the Mississippi-Missouri, is the longest of all rivers (length 4200 miles). The basin of the Mississippi-Missouri is bounded on the east by the Appalachian chain, one of much less comparative magnitude, but forming an important feature of the surface conformation of the continent. In its great navigable rivers and lakes N. America possesses an immense system of inland navigation. As the great water-shed of North America is formed by the Rocky Mountains, all the chief rivers, with the exception of the St. Lawrence, have their sources on its slopes or plateaus, whence they flow to the Gulf of Mexico, the Pacific, the Arctic Ocean, or Hudson Bay. At more than one point in the system the water-parting is formed by a lake or marsh send-

ing a stream on one side to the Pacific and on the other side to the Atlantic. The Nelson, Mackenzie, and Yukon are the chief rivers which flow into the Arctic Ocean, the last named having only recently been recognized as one of the great rivers of the world. The St. Lawrence is the largest of those which flow directly to the Atlantic. The lakes drained by the St. Lawrence, namely, Superior, Michigan, Huron, Erie, and Ontario, together cover an area of 97,000 square miles (or more than that of Great Britain). The largest, Lake Superior, has an area equal to that of Ireland. Other large lakes further to the north include Winnipeg, Athabasca, Great Bear Lake, and Great Slave Lake. The principal islands on the east are Newfoundland, Anticosti, Prince Edward's Island, and Cape Breton, all at the mouth of the St. Lawrence; the Bahama Islands, Cuba, Hayti, Porto Rico, and Jamaica. On the north-west coast the principal islands are Vancouver's Island, Queen Charlotte's Island, and King George III.'s Archipelago. The only others of any importance are the Aleutian Islands, stretching west from the peninsula of Alaska; the islands in the Arctic Ocean are almost inaccessible.

Climate and Productions.—The climate admits of a vast variety of vegetable products being grown, and though in the far north extremely rigorous, as a whole it is healthy and well suited to the peoples of Teutonic origin who now form so large a portion of the inhabitants. As regards minerals and other products N. America is exceptionally favoured, possessing abundance of all those that are most valuable—gold, silver, copper, iron, lead, and coal. Immense quantities of gold and silver have been produced. The coal-fields are of prodigious extent, the Appalachian stretching without interruption 720 miles. The Pittsburg seam is 225 miles in length and 100 in breadth. Iron is worked in many parts, as are also copper and lead. Salt is likewise widely diffused. The forests are of vast extent, and include a great variety of the most useful timber trees, as pines, oak, ash, hickory, beech, birch, poplar, sycamore, chestnut, walnut, maple, cedar, &c. Maize or indian-corn is the only important farinaceous plant peculiar to the New World, but almost all fruits and grains known to Europe are cultivated to perfection in N. America, to which Europe is now indebted for immense quantities of agricultural and dairy produce, as well as provisions of various kinds, and raw materials such as cotton, &c.

Divisions.—The political divisions of N. America are the United States, the Dominion of Canada, Newfoundland, Mexico, and the Central American States. Canada occupies almost the whole of the continent north of the great lakes and lat. 49° N. The territory of the United States extends from the British possessions to Mexico and the Gulf of Mexico, and from the Atlantic to the Pacific Ocean. Alaska Territory, belonging to the U. States, occupies the north-west corner of the continent. The republican form of government prevails everywhere except in the British dominions. The areas and population are as follow:—

	Area, sq. miles.	Pop. 1890.
British America (including Newfoundland)...	3,530,630	4,579,885
United States (including Alaska)	3,602,990	62,978,315
Mexico.....	751,494	11,601,347
Central American States..	173,878	2,844,897
West Indies.....	92,270	5,180,042
	8,151,262	87,184,486

People.—The population now consists most largely of people of British or at least Teutonic origin, though the French and Spanish elements are also well represented. In the U. States people of negro race number (1890) 7,470,040. The aboriginal tribes of N. America, known as Red Indians, are of a hardy and warlike character, but they are gradually dying out before the march of the white man. They have all so strong a resemblance to each other in physical formation and in intellectual character as to leave no doubt of their belonging to one family. (See *Indians, American.*) In Mexico a people, perhaps of same race, the Azteks, had made considerable progress in civilization before the arrival of the Europeans. In the extreme north we find the Esquimaux, who differ considerably from the Indians, but are often classed along with them as people of Mongoloid origin.

Discovery.—America is now believed to have been visited by Norsemen in the 10th and 11th centuries; but the modern discovery is due to Columbus, who reached one of the West Indies in 1492. Following his lead the first to reach the mainland was John Cabot, who, with his son Sebastian, sailed from Bristol in 1497, and on June 24 came in sight of Labrador. In 1512 Sebastian Cabot sailed again for America; but a mutiny on board

his vessels compelled him to return before more had been accomplished than a visit to Hudson's Bay. In the same year Florida was discovered by Ponce de Leon. Giovanni Verazzano, a Florentine sent out by Francis I. of France in 1524, surveyed upwards of 2000 miles of coast, and discovered that portion now known as North Carolina. Ten years afterwards, Jacques Cartier, a seaman of St. Malo, sailed from that port for Newfoundland, the north coast of which he surveyed and minutely described. He subsequently made several voyages, and was the first European to enter the St. Lawrence, ascending it as high as Montreal. The Spaniards had previously conquered Mexico, and a desire to extend their dominion (1519-21) in a northerly direction led to further discoveries in North America. The coast of California was discovered by Ximenes, and in 1539 the Gulf of California was first entered by Francisco de Ulloa. In 1578 Drake visited the north-west coast. These discoveries were followed by those of Davis in 1585–87, Hudson in 1610, Bylot and Baffin in 1615-16, all in the north-eastern seas. By this time settlements had been made by the French, English, and Dutch. The French occupied Nova Scotia and Canada, and latterly Louisiana. Captain Behring, who was sent out in 1725 by the Empress Catharine, set at rest the disputed point whether Asia and America were separate continents. Other names associated with American maritime discovery are Cook, Meares, Vancouver, Kotzebue, and, more recently, Ross, Parry, Franklin, Beechey, M'Clintock; inland discoverers include Hearne, M'Kenzie, Back, Rae, Simpson, Schwatka, Greely, Peary, &c. (See also *North Polar Expeditions.*) The Canadian authorities have in recent years done much in the way of survey and exploring the less-known portions of the Dominion, and Alaska is being made known by the efforts of expeditions from the U. States. For general history see *Canada*, *United States*, *Mexico*, &c.

Northamp'ton, a parliamentary and municipal borough of England, capital of the county of same name, on the left bank of the Nene, which is connected with the Grand Junction Canal. Northampton has several noteworthy churches, especially one of the three remarkable round churches of the country—a Norman structure of great interest; and the other more important buildings are the town-hall, the shire or county hall, the corn-exchange, cattle-market, infirmary, &c. The staple manufacture is boots and shoes for home and export trade. The currying of leather is also carried on on a large scale. There are also iron and brass foundries, breweries, corn-mills, &c. Ironstone is found in the neighbourhood, and smelting-furnaces are at work. The borough sends two members to parliament. Pop. 61,016.—The county is bounded by Lincoln, Rutland, Leicester, Warwick, Oxford, Bucks, Bedford, Huntingdon, and Cambridge; area, 629,912 acres, of which 560,000 acres are under crops. The county is pleasantly diversified by low hills, beautiful vales, extensive woodlands copiously watered by numerous rivers and streams, the chief of them being the Nene, which takes its rise in the high ground near Naseby, and flows through the county to Peterborough and the Wash. The highest eminences are in the south-west, but the most elevated summit is only about 800 feet. The soil is mostly rich and fertile, consisting principally of various kinds of loam. The principal grain crops are wheat, barley, and oats. The rearing of sheep and cattle is a principal object with the Northamptonshire farmers. Ironstone of excellent quality is found in vast beds, and of late years this has developed into an important industry. Northamptonshire is divided into four parliamentary divisions. Pop. 1891, 302,184.

North Attleborough, Bristol co., Mass., 30 m. S. W. of Boston, has high-school and National bank. Principal manuf., jewelry. Pop. 1890, 6727.

Northampton, a city in Hampshire, Massachusetts, U. S., 93 miles west of Boston, has woollen, cotton, and silk factories, paper-mills, &c. Pop. 1890, 14,990.

North Borneo, the territory occupying the northern part of the island of Borneo (which see) under the jurisdiction of the British North Borneo Company, having been ceded by the Sultans of Sulu and Brunei in 1877-78 and the company having received a royal charter in 1881. The territory embraces 31,000 square miles, and has a pop. of 150,000. The interior is very mountainous, one summit, Mount Kini Balu, rising to a height of 13,700 feet. A large portion of the surface is forest and jungle. There is a coast-line of 900 miles, and several splendid harbours. Coal and gold have been found, and the territory is believed to be very rich in minerals. The exports comprise wax, edible birds'-nests, cocoa-nuts, gutta-percha,

sago, tobacco, rattans, india-rubber, and timber. With a good climate and a fertile soil there is believed to be a great future before N. Borneo. Along with Brunei and Sarawak the territory was made a British protectorate in 1888.

Northbrook, Thomas George Baring, Earl of, English statesman, son of the first Baron Northbrook, born in 1826. He entered parliament in the Liberal interest in 1857; was a lord of the admiralty from 1857 to 1858, under-secretary of state for India from June 1859 to Jan. 1861, for war from the latter date to June 1866, and again on the accession of Mr. Gladstone from Dec. 1868 to Feb. 1872, when he was appointed Viceroy of India. This office he resigned in 1876, and was created Earl of Northbrook. On the formation of the Gladstone cabinet in 1880 Lord Northbrook was appointed first lord of the admiralty. In 1886 he was one of those who opposed the Home Rule policy of the premier.

North Cape, a celebrated promontory, forming the most northern point of Europe, and situated on the north of the island of Mageröe, which is separated from the mainland of Sweden by a narrow channel.

North Carolina. See *Carolina.*

Northcote, James, born in Plymouth in 1746, died 1831. He studied art under Sir Joshua Reynolds. He became highly successful as a portrait-painter, and won both wealth and reputation. Two of his best works were for the Shakspere Gallery—the Murder of the Two Princes in the Tower, and Hubert and Arthur. He published Memoirs of Sir Joshua Reynolds, comprising Anecdotes of his Contemporaries (1813), and a Supplement (in 1815); and Memoirs of Titian (1830), in which he was assisted by Hazlitt.

Northcote, Sir Stafford. See *Iddesleigh.*

North-east Passage, a passage for ships along the northern coasts of Europe and Asia to the Pacific Ocean, formerly supposed likely to be of commercial value. The first to make the complete voyage by this passage was the Swedish explorer Nordenskiöld, after it had been from time to time attempted in vain for upwards of three centuries.

North-east Territory, a territory of Canada on the east of Hudson Bay, and extending south to Quebec province. It forms part of the peninsula of Labrador, and is little known. It is intersected by Rupert's River, East Main River, Big River, Great and Little Whale River, &c., all flowing west to Hudson Bay, and contains numerous lakes. Furs are the only commodity as yet obtained from it. See *Canada.*

Northern-drift, in geology, a name formerly given to boulder-clay of the Pleistocene period, when its materials were supposed to have been brought by polar currents from the north.

Northern Lights. See *Aurora.*

Northern Mythology, the mythology of the Scandinavian peoples inhabiting Denmark, Norway, Sweden, and Iceland. According to the Scandinavian mythical cosmogony there were originally no heavens above nor earth below, but only a bottomless deep (*Ginungagap*), north of which was a world of mist (*Niflheim*), and south of which was the world of light or fire (*Muspelheim*). A warm wind blowing from the latter upon the ice of Niflheim melted it, and from the drops sprang Ymir, the ice-giant. Ymir was fed by the cow Audhumbla, which arose in the same way. As she was one day licking blocks of ice, human hair grew out of them, and then an entire man, called Buri. His son was Bor, who had three sons, Odin, Vili, and Ve, who became the rulers of heaven and earth. The children of Bor were good, those of Ymir wicked; and they were constantly at war with each other. The sons of Bor finally slew the ice-giant, dragged his body into the deep, and from it created the world. Out of two trees Odin, Vili, and Ve created a man, called Askur, and a woman, Embla. The earth was supported by a large ash, called Ygdrasil, whose branches extend over the world, while its top reaches above the heaven. The residence of the gods was Asgard, whence the bridge Bifröst led to the earth. The giants dwelt in Jötunheim or Utigard, and men in Midgard. As in Greek mythology there was an older and a newer dynasty of the gods. The ancient and modern systems seem to have their connecting-point in Odin, as with Zeus in the Greek system. Aesir or Aser is the name for the new race of gods. They are Odin, or Woden, the god of gods, the *Alfadur* (All-father), who lives for ever; from him and his wife Frigga are descended the other gods. Among their sons are Thor, god of thunder, the strongest of gods and mortals, whose hammer, Miölnir, crushes the hardest objects, and Baldur, the youthful and beautiful god of eloquence. Niord is the god of winds, of sailors, of commerce, and of riches; his son Frei is the ruler

of the sun, and upon him depend rain and sunshine, plenty or dearth. Freya is the goddess of love. The mildest and most bountiful of the gods, she is a friend of sweet song, and loves to hear the prayers of mortals. Tyr, a son of Odin, the fearless god, who wounds by a look, is lofty as a fir, and brandishes the lightnings of battle. He is not properly the god of war, but rather of power and valour. His brother Braga is the god of wisdom and poetry. Braga's wife is Iduna, who preserves the apples of immortality, which she offers in vessels of gold to the heroes at their entrance into Valhalla. The Valkyrias or 'choosers of the slain' are awful and beautiful beings, neither daughters of heaven nor of hell. Mounted on swift horses, they conducted the heroes to Valhalla. Another striking figure is Loki, as beautiful as he is malignant. By the giantess Angerbode he had Hela, the goddess of the lower regions, the wolf Fenrir, and the terrible serpent of Midgard, Jormungandur, which surrounds the whole earth. Hela rules in Niflheim. All who die of sickness and old age, and not in war, descend to her dark mansion. Other mythical personages were the Norns or fates, and Heimdall, who keeps watch on the bridge Bifröst. The popular belief was all would perish in a final crash of doom.

North Hempstead, Queens co., N. Y. Pop. 1890, 8134.

Northmen, the inhabitants of ancient Scandinavia, or Norway, Sweden, and Denmark, who in England were also called *Danes.* They were fierce and warlike tribes, who as early as the 8th century made piratical expeditions to all parts of the European seas, these piratical robbers being known among themselves as *vikings.* In 795 the Scandinavians established themselves in the Faröe Isles and in Orkney; towards the middle of the 9th century they founded the governments of Novgorod and of Kiev, in Russia; and after the discovery of Iceland certain powerful Norwegian families, taking refuge from the persecutions of Harold, king of Denmark, settled in that island (in 870). In the 9th century they made repeated incursions into France, and it became necessary to purchase their retreat with gold. In that country latterly bands of them settled permanently, and Charles the Simple was obliged (912) to cede to them the province afterwards called *Normandy,* and to give his daughter in marriage to Rollo, their chief. Rollo embraced the Christian religion and became the first Duke of Normandy. The course of events was somewhat similar in England. Egbert, in the beginning of the 9th century, had no sooner made some approaches towards a regular government than the Danes made their appearance. Under Alfred (871–901) they overran great parts of England, but were finally defeated, and those of them who remained in the country had to acknowledge his sway. But they returned, under his successors, in greater force, obtained possession of the northern and eastern part of the country, and in the beginning of the 11th century three Scandinavian princes (Canute, Harold, and Hardicanute) ruled successively over England. The Saxon line was then restored; but in 1066 William, duke of Normandy, a descendant of Rollo, obtained the English throne, an event known as the Norman Conquest. According to the Saga narratives the Northmen were the first discoverers of America. The coasts of Spain, Italy, Greece, and Asia Minor were ravaged by them, and in Byzantium the body-guard of the emperors long consisted of Northmen known as Varangians, being recruited chiefly from those who had established themselves in Russia. See also *Normandy, Normans.*

North Polar Expeditions, expeditions of discovery in the Arctic regions. In 1517 Sebastian Cabot was commissioned by Henry VIII. to search for a north-west passage round America to India; and from that time onwards the discovery of such a passage became a favourite project with explorers. Frobisher, Davis, Hudson, Bylot and Baffin successively engaged in this enterprise. Then after a lapse of nearly two centuries the record of Arctic research was taken up by such men as Ross and Parry (1818), who were followed by Sir John Franklin. Franklin set sail in command of the *Erebus* and *Terror* in May, 1845, and by the month of July reached Whalefish Islands in Davis' Strait. On the 26th of that month the ships were seen in lat. 74° 48′ N.; lon. 66° 13′ W.; after which no further intelligence concerning them was received. It was not, however, till the beginning of 1847 that serious apprehensions were entertained regarding the expedition. The most strenuous efforts were then made by both the English and the Americans to obtain tidings of Franklin. Among the numerous expeditions sent out by sea and land in search of the missing navigator and his company

were those of Richardson and Rae (by land, 1847), of Moore (1848–52), of Kellet (1848–50), of Shedden (1848–50), of Sir James Ross (1848–49), of Saunders (1849–50), of Austin and Ommaney (1850–51), and of Penny (1850–51). In 1850 MacClure set out by Behring's Strait on a search expedition, and to him is due the honour of having ascertained the existence of the long-sought-for north-west passage. Other expeditions between 1850 and 1855 were: Collinson's, Rae's, Kennedy's, Maguire's, Belcher's, MacClintock's, and Inglefield's. In 1853 Rae, proceeding to the east side of King William Sound, obtained the first tidings of the destruction of Franklin's ships. In 1855 Anderson, proceeding up the Great Fish River, also discovered relics of the *Erebus* and *Terror*. At length MacClintock (1857–59) set all doubts at rest regarding the fate of Sir John Franklin and his companions by establishing the fact that they had died in 1847. Dr. Kane made some important observations during the progress of his Arctic explorations, 1853–55. Then followed the expeditions of Dr. Isaac Hayes in 1860 and 1869, and those of Capt. Charles Hall in 1860 and 1864.

Similarly efforts were also made to discover a north-east passage to the Pacific Ocean. In 1553 Willoughby rounded North Cape; in 1556 Burrough reached the south point of Nova Zembla and Waigatch Island; in 1580 Pet and Jackman penetrated into the Sea of Kara; in 1594–96 Barents discovered Bear Island and Spitzbergen, and rounded the east point of Nova Zembla. Dashnef in 1648 discovered Behring's Strait, which was rediscovered in 1728 by Behring, whose name it bears. A more correct idea of the configuration of the coast on either side of Behring's Sea was first obtained by Cook in 1778; but with the exception of this, to the Russians is due nearly all the credit, until recently, of the explorations on the North Asiatic coasts. The north-east passage was at last accomplished by Prof. Nordenskjöld of Stockholm, who in 1878 sailed eastward along the whole of the north coast of Europe and Asia, emerging through Behring's Strait early in 1879.

The northern portion of the American continent, in the region of the Coppermine River, was first explored by Hearne in 1771, In 1789 Mackenzie discovered the great river called after him. The north coast eastwards to the Great Fish River was explored by Franklin, Richardson, and Back in two expeditions by land, the first from 1819 to 1821, and the second from 1825 to 1826, while in 1834–35 Back in company with King proceeded down the Back or Great Fish River. Finally Lieut. Schwatka headed an overland expedition in 1879–80 in search of the journals of the Franklin expedition. Nares (Gt. Br.), '75, explored Greenland, returning in October, 1876. One of its sledge-parties reached 83° 20′ N. lat., the second highest latitude ever attained. Of later expeditions may be mentioned that of the unfortunate and ill-advised *Jeannette* (1879), sent out under the command of Lieutenant De Long, to explore the Arctic Sea through Behring's Strait; those of Mr. Leigh Smith in 1880 and 1881, in the latter of which he lost his vessel; and that of Sir C. Young for the relief of the former. An expedition sent by the U. States under Greely (1881–84) reached 83° 24′ N. In 1888 South Greenland was crossed by Nansen, and March 14, 1895, he attained 83° 59′. In 1892 Peary traced Greenland to 82° N. July 10, 1897, Andrée, in a baloon, attempted reaching the pole, and has not since been heard of, except in hypothetical letters by pigeons.

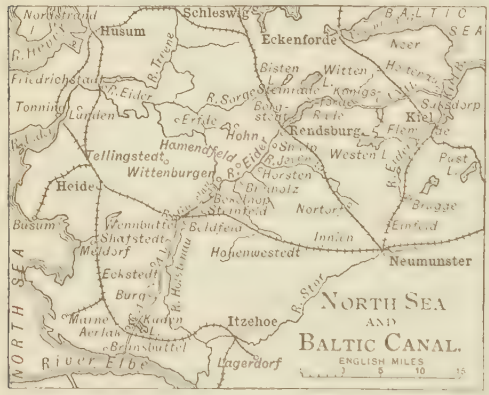
R. E. Peary in Steamship Windward, presented to him for the purpose by Alfred Harmsworth, prop. of the Daily Mail, London, sailed from N. Y., July 2, 1898. He took but one white man on the expedition, his intention being to rely upon the esquimaux. A party of these will be sent in advance to 85°-86° N. Lat., there to establish a base of supplies. Peary takes a four years' equipment of stores. See *Peary*, Robert E.

North Pole. See *Pole.*

North Sea, or GERMAN OCEAN, a large branch of the Atlantic Ocean lying between Great Britain and the continent of Europe, having the former and the Orkney and Shetland Islands on the west; Denmark and part of Norway on the east; Strait of Dover, part of France, Belgium, Holland, and Germany on the south; and the Northern Ocean on the north. Extreme length, from the Strait of Dover to Unst, the most northern of the Shetland Isles, about 700 miles; greatest breadth, between Haddingtonshire, Scotland, and Denmark, about 420 miles; area, not less than 140,000 square miles. The North Sea is deepest on the Norwegian side, where the soundings give 190 fathoms; but its mean depth is no more than 31 fathoms. The bed of this sea is traversed by several enormous banks or

elevations, of which the greatest is the Dogger Bank (which see). The shores of the sea are for the most part low, except in Scotland and Norway. They present numerous estuaries and other inlets, and are studded with numerous important towns, the sea being the highway for an immense maritime traffic. The fisheries, especially of herring, cod, ling, haddock, flat-fish, &c., are exceedingly valuable. The rise and fall of the tide is very great at certain places. The navigation, on account of sand-banks, winds, fogs, &c., is rather dangerous, but numerous lighthouses help to render it safer. There are numerous islands along the coasts of Holland, North Germany, Denmark, and Norway.

North Sea and Baltic Canal, a great ship canal recently constructed at the cost of



the German Empire, from Brunsbüttel at the mouth of the Elbe to the southernmost part of the Eider, and thence along the course of that river to Rensborg, from which place it follows the same course as the present Eider Canal to where it joins the Baltic at Holtenau, near Kiel. The waterway is about 185 feet wide at the surface and 85 feet at the bottom, with a depth of 25 feet, and is intended for the passage of men-of-war as well as merchant ships, serving thus a double purpose. Its length is 61 miles. The foundation-stone of the new lock at Holtenau was laid by the Emperor William I. in June, 1887. The total cost of the construction was 156,000,000 marks (£7,800,000), towards which Prussia contributed fifty millions. The canal was opened in 1895 with much ceremony.

North Sea Canal (called in Holland the Amsterdam Canal), a great ship canal that connects Amsterdam with the North Sea, running east and west across the narrow neck of land that unites North Holland to the rest of the kingdom. See *Amsterdam.*

North Shields. See *Shields.*

North-star, the north polar star, the star *α* of the constellation Ursa Minor. It is close to the true pole, never sets, and is therefore of great importance to navigators in the northern hemisphere.

North Star, Order of, a Swedish order of knighthood, established in 1748 mainly as a recognition of important scientific services.

Northum'berland, a northern maritime county of England, bounded south and southwest by the counties of Durham and Cumberland; east by the North Sea, and north and north-west by Scotland. Area, 1,290,312 acres, of which about 717,000 acres are arable, meadow, and pasture. The highest hills, the Cheviots, on the north-west border, towards Scotland, are admirably suited for pasture lands, and are extensively used for feeding the breed of sheep to which they give their name. The county is watered by the Tyne, Wansbeck, Blyth, Coquet, Aln, and Till. Coal-measures occupy an area of 180 square miles, and yield immense quantities of coal; lead, iron, limestone, and freestone are also wrought. Arable and stock husbandry are both prosecuted with success, and the short-horned cattle mostly reared are much prized. The chief industries include ship-building and rope-making; forges, foundries, iron, hardware, and machine works, chemical works, potteries, glass-works, &c. The coast abounds in cod, ling, haddock, soles, turbot, herrings, and a variety of other fishes. Northumberland is divided into four parliamentary divisions, Wansbeck, Tyneside, Hexham, and Berwick-upon-Tweed, each returning one member. Principal towns, Newcastle, Tynemouth, Shields, Morpeth, and Alnwick. Pop. 1891, 506,096.

Northumberland, Dukes of. See *Dudley, Percy.*

Northum'bria, one of the seven Saxon kingdoms of Britain, which extended from the Humber to the Forth, and was bounded

on the west by the kingdoms of Strathclyde and Cumbria. It was founded by Ida, an Anglian chief, in 547, and at first extended only from the Tyne to the Forth, and was known by the name of Bernicia. In 560 the Kingdom of Deira, the district between the Tees and the Humber, was added to Northumbria. During the 8th century it was the home of Bede, Alcuin, Egbert, and other great scholars. It was the scene of important events in English history till the grant of the Lothians to the King of Scots, and its final conquest by William I.

North Walsham, a market town of England, in the county of Norfolk, 14 miles N.N.E. from Norwich, on the rivers Ant and Bure. Pop. 3234.

North-west Passage, a passage for ships from the Atlantic Ocean into the Pacific by the northern coasts of the American continent, long sought for, and at last discovered in 1850–51 by Sir R. MacClure. See *North Polar Expeditions*.

North-west Provinces, a political division (lieutenant-governorship) of British India, bounded on the N. by Tibet, on the N.E. by Nepaul and Oudh, on the S. by the Chutia Nagpur districts and the Central Provinces, and on the W. by Gwalior, Rajputána, and the Punjab; area 86,983 square miles. The administrative headquarters of the lieutenant-governor is at Allahabad. The three great rivers of this district are the Ganges, the Jumna, and the Gogra, while an extensive system of irrigation by canals makes it the richest wheat-growing division of India. It also contains many of the most notable cities in Indian history, while at the present time it has a large agricultural population and numerous commercial centres. The climate as a whole may be described as dry and hot, the more oppressive districts being in the plains about Allahabad and Benares. Its principal exports are in raw agricultural produce, such as wheat, oil-seeds, indigo, cotton, opium, and tobacco. A part of the traffic is still conducted by the Ganges and the Jumna, but the larger portion goes now by rail direct to Calcutta. The administration of Oudh is partly under the charge of its lieutenant-governor. The provinces are Meerut, Rohilkand, Agra, Jhansi, Allahabad, Benares, Kumaun, with the native states of Garhwal and Rampur. Pop. 33,461,878.

North-west Territories, that portion of north-western Canada outside the provinces of Ontario, Quebec, Manitoba, and British Columbia, formerly the Hudson's Bay Territory; estimated area, 2,648,000 square miles (some estimates make it more). This region is governed by a lieutenant-governor and a council of seven members, there being also a legislative assembly partly elected, partly nominated. Regina is the seat of government. The southern part of this vast territory has been divided into the districts of Assiniboia (89,535 sq. m.), Saskatchewan (107,092 sq.m.), Alberta (106,100 sq.m.), and Athabasca (104,500 sq. m.), which in time may take the full rank of provinces. The agricultural and other capabilities of at least a third of this region are very great, there being vast areas adapted for wheat, oats, barley, &c., or for stock-rearing; and land in the districts just mentioned is being rapidly taken up. Coal is abundant, and is now being worked; petroleum also is abundant; copper, silver, iron, salt, and gold have been found in various localities. Great quantities of furs are obtained, especially by the agents and employees of the Hudson Bay Company, to whom the whole territory formerly belonged, and who have many outlying forts and stations. There are many lakes and rivers, the former including Athabasca, Great Slave Lake, Great Bear Lake, &c.; and the latter the Saskatchewan, Athabasca, Peace, Mackenzie, &c., giving 10,000 miles of navigable rivers. (See also *Canada*.) The Canadian Pacific Railway crosses the southern part of this magnificent territory, and towns and villages are rapidly being formed along its course. There are several other railways made or to be made, one running north-west from Regina to Battleford and Edmonton. Schools are being established in the more thickly-settled parts, and education is free. In the Rocky Mountain region five tracts of land have been reserved as national parks, on account of their interesting scenery. One of these, 260 sq. m. in area, presents a remarkable aggregate of lake, river, and mountain scenery, including the hot mineral springs of Banff, which are already being taken advantage of by persons suffering from various ailments.

Northwich, a town in Cheshire, 15 miles north-east of Chester, with numerous brine-springs and extensive mines of rock-salt. Pop. 14,914.—It gives name to a parliamentary division of Cheshire. Pop. 57,607.

Norton, The Hon. Caroline, an English poetess and novelist, grand-daughter of R. Brinsley Sheridan; born in 1808, died 1877.

She married in 1829 the Hon. George C. Norton; but the marriage did not prove a happy one, and from 1836 she lived apart from her husband. After the death of the latter in 1875 she married Sir W. Stirling-Maxwell.

Norwalk, Huron co., Ohio, 95 m. N. E. from Columbus, has foundries, machine shops, flouring and saw-mills. Pop. 7195.

Norwalk, a town of Connecticut, U.S., on Long Island Sound, 43 miles north-east of New York by rail. It has a good harbour, and its iron-works and lock-works are among the largest in the States. It also has a considerable oyster trade. It is a convenient summer residence for New York merchants. Pop. 1890, 17,747.

Norway (Norwegian, NORGE), a country in the north of Europe, bounded on the north-east by Russian Lapland, and east by Sweden, and washed on all other sides by the sea—by the Arctic Ocean on the north, the Atlantic and the North Sea on the north-west and west, and the Skager-Rack on the south. It is about 1080 miles in length, and its greatest breadth is about 275 miles, but towards the north it narrows so much as to be in some places not more than 20 miles; area, 124,495 square miles, or rather more than the British Isles. The total population in Jan., 1891, was estimated at 2,001,000. The country is divided into twenty prefectures, of which the capital Christiania forms one, and the city of Bergen another. Other important towns are Trondhjem, Stavanger, and Drammen.

Physical Features.—The coast consists chiefly of bold precipitous cliffs, and is remarkable both for the innumerable islands by which it is lined, and the bays or fiords which cut deeply into it in all directions. The surface is very mountainous, particularly in the west and north. Very commonly the mountain masses assume the form of great plateaux or table-lands, called *fjelds* or *fields*, as the Dovre Fjeld, Hardanger Fjeld, &c. The highest summits belong to the Sogne Fjeld, a congeries of elevated masses, glaciers, and snow-fields in the centre of the southern division of the kingdom, where rise Galdhoepig (8400 feet), the Glitretind (8384), and Skagastölstind (7879). Immense snow-fields and glaciers are a feature of Norwegian scenery. The few important rivers that Norway can claim as exclusively her own have a southerly direction, and discharge themselves into the Skager-Rack; of these the chief are the Glommen (400 miles), and its affluent the Lougen. The most important river in the north is the Tana, which forms part of the boundary between Russia and Norway, and falls into the Arctic Ocean. Lofty waterfalls are numerous. Lakes are extremely numerous, but generally small. The principal is the Miösen Vand. The prevailing rocks of Norway are gneiss and mica-slate, of which all the loftier mountains are composed. The most important metals are iron, copper, silver, and cobalt, all of which are worked to a limited extent. The climate of Norway is on the whole severe. The harbours on the west, however, are never blocked up with ice; but in places more inland, though much farther south, as at Christiania, this regularly happens. The forests are estimated to cover about a fifth of the whole surface, and form a very important branch of national wealth. The principal forest tree is the pine. Only about 1000 sq. miles is under the plough. The chief cereal crop is oats. Barley ripens at 70° of latitude; rye is successfully cultivated up to 69°; oats to 68°; but wheat not beyond 64°, and that only in the most favourable seasons. Potatoes are grown with success even in the far north. The farms are generally the property of those who cultivate them, and commonly include a large stretch of mountain pasture, often 40 or 50 miles from the main farm, to which the cattle are sent for several months in summer. The rearing of cattle is an extensive and profitable branch of rural economy. The horses are vigorous and sure-footed, but of a diminutive size; the ponies are among the best of their kind, and are often exported. The reindeer forms the principal stock in the extreme north. Among the larger wild animals are the wolf, bear, elk, deer. The fisheries of Norway are of very great value; they include the cod, herring, mackerel, salmon, shark, walrus, seal, and lobster, the cod and herring fisheries being by far the most important. The rivers and lakes abound with salmon and salmon-trout, and make Norway one of the best angling countries in the world. Manufactures include cotton, woollen, flax, and silk tissues. Distilleries, brick-works, saw and flour mills, are numerous; and there are foundries, machine-works, lucifer-match works, tobacco-factories, and sugar-refineries. The export trade includes fish, timber, wood-pulp, whale and seal oil, metals, skins, feathers, furs, matches, &c. The exports in 1891 were 124,082,300 kroner. The chief imports are grain, textile goods, wool, sugar, coffee, tobacco, wine, brandy, petroleum, &c.

Imports, 1891, 223,023,600 kroner; chief trade is with Britain and Germany; Sweden, Denmark, and Russia coming next. The Norwegians are famous as sailors, and the country possesses the largest mercantile navy in Europe next to Britain. Bergen, Christiania, and Trondhjem are the chief ports. There are about 1000 miles of railway. The monetary system is the same as that of Denmark.

Government, People, &c.—Norway is a limited hereditary monarchy, united with Sweden as a free and independent kingdom. The king is not allowed to nominate any but Norwegian subjects to offices under the crown. On a new succession the sovereign must be crowned King of Norway at Trondhjem. The members of the legislative assembly or Storthing are elected every three years by voters who have themselves been elected by the citizens possessing a certain qualification. It subdivides itself into two chambers —one, the Lagthing, consisting of one-fourth of the members; the other, the Odelsthing, has the remaining three-fourths. The chambers meet separately, and each nominates its own president and secretary. Every bill must originate in the Odelsthing. When carried in that body it is sent to the Lagthing, and thence to the king, whose assent makes it a law. The great body of the people are Protestants of the Lutheran confession, which is the state religion. Other sects are tolerated, although government offices are open only to members of the Established Church. Elementary education is free and compulsory. Besides primary schools there are numerous secondary schools. There is but one university, that of Christiania. The army is raised mainly by conscription. The nominal period of service is thirteen years, five in the line, four in the *Landvœrn* (liable to be called to defend the country), and four in the *Landstorm* (for local defence). The troops of the line number 18,000. The navy comprises four iron-clads besides other vessels. The revenue in 1891 was 51,446,000 kroner; public debt, 48,994,000 kroner. The people are almost entirely of Scandinavian origin. A small number of Lapps (called in Norway Finns) and Qvaens, reckoned at 20,000 in all, dwell in the northern parts. The Norwegian language is radically identical with the Icelandic and with the Danish. For centuries Danish was generally employed as the literary and educated language of the country, as it still is; but during this century a vernacular literature has sprung up, the chief names connected with which are Wergeland, Welhaven, Asbjörnsen, Björnson, Ibsen, &c.

History.—In the earliest times Norway was divided among petty kings or chiefs (*jarls*), and its people were notorious for their piratical habits. (See *Northmen.*) Harold Fair-hair (who ruled from 863 to 933) succeeded in bringing the whole country under his sway, and was succeeded by his son Erick. He was ultimately driven from the throne, which was seized in 938 by his brother, Hako I., who had embraced Christianity in England. Magnus the Good, the son of St. Olaf and Alfhild, an English lady of noble birth, was called to the throne in 1036; and having in 1042 succeeded also to the throne of Denmark, united both under one monarchy. (See *Denmark.*) After his death the crowns of Norway and Denmark again passed to different individuals. In 1319 the crowns of Norway and Sweden became for a short time united in the person of Magnus V. Erick of Pomerania succeeded, by separate titles, to Norway, Sweden, and Denmark; and in 1397 was crowned king of the three kingdoms. Sweden then for a time became a separate kingdom; but the union between Denmark and Norway was drawn closer and closer, and very much to the disadvantage of the latter, which was ultimately degraded into a mere dependency of the former. The subsequent history of Norway becomes for a long period merely a part of that of Denmark. After the defeat of Napoleon by the allies in 1813 it was arranged by the treaty of Vienna in 1814 that Denmark must cede Norway to Sweden, and the result was the union of the two countries under the Swedish crown. The union has not been unaccompanied with a certain amount of friction, partly owing to the entirely democratic character of the constitution of Norway, in which country titles of nobility were abolished early in the present century. The right claimed by the king to veto absolutely bills passed by elected representatives met with an overwhelming protest by the people, the struggle lasting until 1884. In 1891 an election held for members of the Storthing resulted in a majority for the party which advocates the appointment of separate foreign ministers for Sweden and Norway.

Norway-spruce, a tree of the genus *Abies*, *A. excelsa*, which abounds in Norway. It is used for a great variety of purposes in building.

Norwich (nor'ich), a municipal and parliamentary borough and bishop's see in England, the seat of the county of Norfolk, on the Wensum, where it joins the Yare, 98 miles N.N.E. of London. It is a picturesque old town, and with its gardens and orchards covers a large area. The cathedral, founded in 1094, was originally in the Norman style, but now exhibits also later styles. It is a fine edifice with extensive cloisters, and a lofty tower and spire 315 feet high. The castle, a noble feudal relic, reputed to have been built by Uffa about 1066, is finely situated on a lofty eminence, and still surmounted by its massive donjon tower in the Norman style. St. Andrew's Hall, originally the nave of the Blackfriars' Church, the Guildhall, and the bishop's palace, also deserve mention. Manufactures, of which worsted and mixed goods are the staple, are extensive, including also mustard and starch, boot and shoe making, iron-working, brewing, &c. The foundation of Norwich cannot be fixed earlier than 446. Rising to the position of capital of the Kingdom of East Anglia, it had, by the middle of the 10th century, become a large and wealthy town; but in 1002 it was laid in ashes by the Danes. Shortly after rebuilt by the Danes themselves, it had become in the 11th century a large and populous place. In 1296 it began to send representatives to parliament. In 1328 Edward III. made it a staple town for the counties of Norfolk and Suffolk, and induced great numbers of Flemings to settle in it. Pop. 1891, 100,964.

Norwich, Chenango co., N. Y., on Chenango R. and canal. It has manufactories of carriages, pianos, &c. Pop. 1890, 5212.

Norwich, a city of the United States, in Connecticut, on the Thames, 13 miles north of New London. The falls of the river afford extensive water-power, and there are considerable manufactures of cotton and woollen goods, paper, fire-arms, machinery, &c. Pop. 1890, 16,156.

Norwich Crag. See *Norfolk Crag*.

Nose, the organ in man and the higher animals exercising the olfactory sense, or that of smell, and concerned through its apertures or passages in the function of respiration and in the production of voice. The bones of the nose comprise the boundaries of the nasal *fossæ* or cavities, which open in front in the nasal apertures, and behind into the pharynx or back part of the mouth. The front nostrils, or openings of the nose, are in the skeleton of an oval or heart shape, while the openings of the posterior nostrils are of a quadrilateral form. The bones which enter into the entire structure of the nose number fourteen. In addition there are certain cartilaginous pieces which assist in forming the structure of the nose, lateral cartilages on either side, and a cartilaginous septum in the middle between the two nostrils. There is also a bony septum which unites with the cartilaginous septum to form the complete partition of the nose. Several special muscles give a certain mobility to the softer parts of the organ. The nostrils and nasal cavities are lined by the mucous membrane (*pituitary* membrane) richly furnished with arteries and veins and covered with a copious mucous secretion which keeps it in the moistened state favourable to the due exercise of the function of smell. The proper nerves of smell, the *olfactory* nerves, form the first pair of cerebral nerves or those which take origin from the cerebrum; while the nerves of common sensibility of the nose belong to the fifth pair of cerebral nerves. The olfactory nerves are distributed in the mucous membrane of either side in the form of a sort of thick brush of small nerve-fibres. The study of the comparative anatomy of the nasal organs shows us that man possesses a sense of smell greatly inferior in many instances to that of the lower animals. The distribution of the olfactory nerves in man is of a very limited nature when compared with what obtains in such animals as the dog, sheep, &c. All Vertebrates above fishes generally resemble man in the essential type of their olfactory apparatus. In most fishes the nostrils are simply shut or closed sacs, and do not communicate posteriorly with the mouth. The proboscis of the elephant exemplifies a singular elongation of the nose, in which the organ becomes modified for tactile purposes. In the seals and other diving animals the nostrils can be closed at will by sphincter muscles or valvular processes. The most frequent diseases or abnormal conditions which affect the nose comprise congenital defects, and tumours or polypi.

Nosology (from the Greek *nosos*, disease), in medicine, that science which treats of the systematic arrangement and classification of diseases, with names and definitions, according to the distinctive character of each class, order, genus, and species. Many systems of nosology have been proposed at different times, but that of Dr. William Farr has

been very generally adopted as practically useful. By this system all diseases are classed under the heads of (1) Zymotic Diseases, including fevers and all diseases that may be attributed to the introduction of some ferment or poisonous matter into the system; (2) Constitutional Diseases, as gout, rheumatism, cancer, scrofula, consumption, &c.; (3) Local Diseases, as diseases connected with the nerves, circulation, digestion, respiration, urinogenital system, skin, &c.; and (4) Developmental Diseases, as malformations, special diseases of women, diseases connected with childhood or old age, &c.

Nossi-bé, an island off the north-west coast of Madagascar, belonging to France. It is about 14 miles long by 8 miles broad, has a mountainous surface, and appears to be of volcanic origin. It is very fertile, and has a population of between 7000 and 8000 souls. Rice, maize, manioc, and bananas are the principal products, and the sugar-cane and the coffee-plant are successfully cultivated. It has a splendid harbour.

Nossi Ibrahim, or SAINTE MARIE, an island on the east coast of Madagascar, 33 miles in length, with an average breadth of 12 miles, separated from the island of Madagascar by a channel 5 miles in width. It has been a French possession definitely since 1815. It is neither fertile nor healthy. Pop. 7654.

Nostalgia. See *Home-sickness.*

Nostoc, a genus of green-spored gelatinous algæ, frequent especially in sandy soils and immediately after rain in summer, and vernacularly called *witches' butter*, *fallen stars*, &c. Many of the species are edible, the *N. edāle* of China being a favourite ingredient in soup.

Nostrada'mus, true name MICHEL DE NOSTREDAME, a French physician and astrologer, born 1503, died 1566. He belonged to a Jewish family. He studied first at Avignon, and afterwards at the medical school of Montpellier. After taking his degree he acted for some time as a professor, but afterwards settled as a medical practitioner at Agen, and finally, after travelling in Italy, at Salon, near Aix, about 1544, where he wrote his famous Prophéties or astrological predictions written in rhymed quatrains. They obtained great success, although many condemned their author as a quack. Catharine de' Medici invited him to court to cast the horoscope of her sons; the Duke of Savoy travelled to Salon for the express purpose of visiting him, and on the accession of Charles IX. he was appointed royal physician. In 1550 he published an almanac containing predictions about the weather, the first of a numerous family of such productions.

Nota, ALBERTO, Italian dramatic poet, born 1755, died 1847. Of his numerous comedies, La Fiera, a graphic and amusing description of manners, is perhaps the best. Many of them have been translated into French, Spanish, German, &c.

Notables, in French history, a body consisting of noblemen, archbishops, high legal functionaries, magistrates of cities, &c., appointed and convoked from time to time by the king, as being a more pliant instrument than the states-general. The first assembly of notables of any importance was in 1558. For long there had been no meeting, but the troubles preceding the revolution led to the notables being assembled in 1787. A second meeting was held in November, 1788, to consult on the manner of assembling the states-general; but soon after everything was overturned by the revolution.

Notary, an officer authorized to attest contracts or writings, chiefly in mercantile matters, to make them authentic in a foreign country; to note the non-payment of foreign bills of exchange, &c. Often called a *Notary Public.*

Notation, ARITHMETICAL, ALGEBRAIC, CHEMICAL, MUSICAL. See *Arithmetic, Algebra, Chemistry, Music.*

Note, in music, a character which, by its place on the staff, represents a sound, and by its form determines the relative time or continuance of such sound. See *Music.*

Not Guilty is the general issue or plea of the accused in a criminal action. When a prisoner has pleaded not guilty he is deemed to have put himself forward for trial, and the court may order a jury for the trial of such person accordingly. Should he refuse to plead the court may direct the proper officer to enter a plea of not guilty on his behalf. On an indictment for murder a man cannot plead that it was in his own defence, but must answer not guilty; the effect of which is, that it puts the prosecutor to the proof of every material fact alleged in the indictment, and it allows the prisoner to avail himself of any defensive circumstance as fully as if he had pleaded them in a specific form. In England and the United States a jury can only give a verdict either of guilty or not guilty, and the latter often really means that there is not sufficient

evidence to convict. In such circumstances the verdict in Scotland would be 'not proven;' a verdict of not guilty in that country meaning that the accused is entirely innocent of the charge alleged.

Noto, a town of Sicily, in the province of Syracuse, on the left bank of the Noto, near its mouth in the Ionian Sea. It was a place of great strength under the Saracens, and one of the most agreeably situated and best-built towns in the island. Pop. 18,202.

No'tochord, in animal physiology, a fibro-cellular rod which is developed in the embryo of vertebrates immediately beneath the spinal cord. It is persistent in the lower vertebrates, but in the higher is replaced in the adult by the vertebræ, which are developed in its surrounding sheath. It is often spoken of as the *chorda dorsālis*.

Notor'nis, a genus of grallatorial or wading birds, found inhabiting the South Island of New Zealand. It was first known to science by the discovery of fossil remains; but subsequently the genus was found to be still represented by living forms. The Notornis is most nearly allied to the Coots. It is, however, of larger size than these birds, and differs from them in the rudimentary nature of the wings.

Notothe'rium, an extinct genus of marsupial or kangaroo-like animals, the fossil remains of which are found in deposits of Upper Pliocene age in Australia. The *Nototherium Mitchelli* is a described species of this extinct genus.

Not Proven, in Scotch law, a verdict returned by a jury when there is not sufficient evidence to convict the prisoner at the bar, while there is some apparent foundation for the charge. Its practical effect is equivalent to a verdict of 'not guilty' (but with an essential difference—see *Not Guilty*), and the accused cannot be tried afterwards for the same offence.

Notre Dame (nō-tr dàm; French, 'Our Lady'), a title of the Virgin Mary, is the name of many churches in France, and particularly of the great cathedral at Paris, which was founded in the 12th century, and forms a prominent object in the city.

Nottingham, a town near the middle of England, capital of the county of same name, on the Leen, near its junction with the Trent, 110 miles north-west of London. It occupies a picturesque site overlooking the Vale of Trent, and has one of the finest and largest market-places in the kingdom. The castle, which crowns the summit of a rock, rising 133 feet above the level of the Leen, was originally built by William the Conqueror as a means of overawing the outlaws frequenting the recesses of Sherwood Forest. Dismantled during the Protectorate, it subsequently became the property of the Duke of Newcastle, who in 1674 erected a large mansion on part of the site. This, after being partly burned in riots connected with the reform movement in 1831, now contains the Midland Counties Art Museum, free library, &c. The principal educational and literary institutions are the University College and Technical School, high-school for boys, the Blue-coat School, the school of art, the People's Hall, and the Mechanics' Institute. An arboretum covering 18 acres is a feature of the town. The staple manufactures are hosiery and lace, the latter being a sort of specialty. There are also manufactures of cotton, woollen, and silk goods, and of articles in malleable and cast iron. The borough sends three members to parliament. Nottingham was a place of importance in Anglo-Saxon times, and was twice or thrice taken by the Danes. Charles I. raised his standard here in 1642, and next year the town and castle were taken by the Parliamentarians. Serious riots, occasioned by the introduction of machinery, took place in 1811–12 and 1816–17. Pop. 211,984.—NOTTINGHAMSHIRE, also called NOTTS, is an inland county, bounded north by York, east by Lincoln, south by Leicester, and west by Derby. Area, 526,176 acres, of which about 454,000 are arable, meadow, and pasture. The general surface, with exception of the Vale of Trent, is undulating. The principal river is the Trent, with its affluents the Soar and Idle. The greater portion of its area is composed of rocks of the Permian and New Red Sandstone systems. The chief mineral is coal. The soil is generally extremely fertile. The crops usually cultivated are wheat, rye, barley, oats, beans, and pease. The manufactures include lace, hosiery, machinery, silk and cotton spinning, bleaching, coal-mining, iron and brass founding, glove-making, &c. The county is divided into four parliamentary divisions, Bassetlaw, Newark, Rushcliffe, and Mansfield, each returning one member. Pop. 1891, 445,599.

Nottingham, HENEAGE FINCH, FIRST EARL OF, was the son of Heneage Finch, recorder of the city of London, was born in 1621, and died in 1682. He was an ardent royalist, was called to the bar in 1645, and at the Restoration was appointed solicitor-general,

in which capacity he signalized his zeal in the prosecution of the regicides. In 1661 he was elected member for the University of Oxford and obtained a baronetcy, and six years afterwards took a prominent part in the impeachment of the Earl of Clarendon. In 1670 he became attorney-general, and in 1675 he obtained the chancellorship. In 1681 his services were rewarded with the earldom of Nottingham. Dryden has handed down to posterity his portrait in Absalom and Achitophel, under the character of Amri.

Notturna. See *Nocturne.*

Noukha. See *Nucha.*

Nouméa (nö-mā'a; also called PORT DE FRANCE) is the chief settlement in the French penal colony of New Caledonia (which see). Pop., besides convicts and soldiers, about 5000.

Nou'menon (pl. NOUMENA), in Kant's philosophy, an object conceived by the understanding or thought of by the reason, as opposed to a *phenomenon*, or an object such as we represent it to ourselves by the impression which it makes on our senses. The *noumenon* is an object in itself, not relatively to us.

Noun (from the Latin *nomen*, name), in grammar, a word that denotes any object of which we speak, whether that object be animate or inanimate, material or immaterial. Nouns are called *proper* or *meaningless* when they are the names of individual persons or things, as George, Berlin, Orion; *common*, when they are the name of a class of things, as book, page, ball, idea, emotion; *collective*, when they are the names of aggregates, as fleet, army, flock, covey, herd; *material*, when they are the names of materials or substances, as gold, snow, water; *abstract*, when they are the names of qualities, as beauty, virtue, grace, energy. Some of the older grammarians included both the noun and the adjective under the term *noun*, distinguishing the former as *noun-substantive* and the latter as *noun-adjective.*

Noureddin Mahmoud, MALEK-AL-ADEL, one of the most distinguished of the Moslem rulers of Syria, succeeded his father as emir of Aleppo in 1145. On attaining power he proceeded to grapple with the Christians, and inflicted a disastrous defeat upon them under the walls of Edessa, taking that city by storm. This disaster to the Christian arms occasioned the second crusade. Noureddin now attempted to expel the Christians from Palestine, and before 1151 all the Christian strongholds in Syria were in his possession. An illness, however, which prostrated him in 1159, enabled the Christians to recover some of their losses; and when well enough to take the field he suffered defeat at the hands of Baldwin, king of Jerusalem. Afterwards, however, he overthrew the Christian princes of Tripolis and Antioch, making prisoners of them both. Subsequently Noureddin overran Egypt, and was invested with the governorship of that country and of Syria. He died at the height of his success in 1174.

Nova'lis. See *Hardenberg, Friedrich von.*

Nova'ra, a town of Northern Italy, capital of province of same name, beautifully situated between the Agogna and Terdoppia, 53 miles E.N.E. of Turin. Its rice and grain markets are the most important in Piedmont. Novara is famous for the battle fought there on 23d March, 1849, between the Sardinians and Austrians, in which the former were completely defeated, and Charles Albert induced in consequence to abdicate in favour of his son Victor Emmanuel. Pop. 14,785.

Nova Scotia, a province of the Dominion of Canada, consisting of a peninsula or portion properly called Nova Scotia, and the Island of Cape Breton, which is separated from the mainland by the Strait or Gut of Canso. It is bounded on the north by Northumberland Strait and the Gulf of St. Lawrence; north-east, south, and south-east by the Atlantic; west by the Bay of Fundy; and north by New Brunswick, with which it is connected by an isthmus only 11 miles broad (traversed by a ship railway); area, 20,907 square miles, or over 13,000,000 acres. Of the whole about 5,000,000 acres are fit for tillage. The south-eastern coast is remarkable for the number and capacity of its harbours. There are no mountains of magnitude, but ranges of hills traverse the peninsula on the north-west side. There are a number of lakes, but no streams of great size. The forests are extensive and valuable. There is much beautiful scenery, and the climate is the most equable in Canada. The wild animals include bear, foxes, moose, caribou, otter, mink, &c., and excellent sport may be had. The minerals are also valuable. Granite, trap, and clay-slate rocks predominate. Coal, with iron in combination, abounds in many places, and more than 1,500,000 tons is raised annually. Gold is also found, and is being worked. Copper-ore exists, as also does silver, lead, and tin;

and gypsum is plentiful. Petroleum has been recently discovered, and wells have been sunk in Cape Breton. Wheat, potatoes, and oats are important crops; and buckwheat, rye, barley, Indian corn, and field-pease are extensively cultivated. Great quantities of hay are made, and a good deal is exported. The apple-orchards of the western counties are very productive, and extend along the highway in an unbroken line for 30 miles. Apples are now largely exported. Cattle and sheep are raised in considerable numbers, and are exported both to New Brunswick and Newfoundland. There are extensive fisheries of cod, haddock, mackerel, herrings, &c. The manufactures are comparatively unimportant, but a good deal of capital is invested in saw-mills, flour-mills, ship-building, tanning, &c. The foreign trade is comparatively large, more shipping being owned in proportion to population than in any other country. The imports consist principally of British and American manufactures; spirits, sugar, wines, coffee, &c. The principal articles of export are fish, timber, and coal. Education is widely and equally diffused and is free to all classes. There are four degree-conferring colleges or universities. The public affairs of the colony are administered by a lieutenant-governor, council, and house of assembly. It sends twelve members to the senate and eighteen to the House of Commons of the Dominion parliament. The laws are dispensed by a supreme court and district courts as in Canada. Halifax, the capital, possesses one of the finest harbours in America. The province is well provided with railways.

Nova Scotia was first visited by the Cabots in 1497, but was not colonized by Europeans till 1604, when French settlements were made at Port Royal, St. Croix, &c. Under the French Nova Scotia (with New Brunswick) was known as Acadia or Acadie. The French colonists were more than once almost entirely driven out by the English. In 1621 Sir William Alexander obtained from James I. a grant of the country, but his attempt to colonize it proved a failure. In 1654 Cromwell took possession of the country, which remained with the English till 1667, when it was ceded to France. But in 1713 the country was again ceded to England. In 1755 the French colonists were almost all forced to leave the country owing to their hostility to the English. In 1763 the island of Cape Breton was annexed to Nova Scotia, but was separate in 1784–1820. In 1784 New Brunswick was detached. In 1867 the province became a member of the Dominion of Canada. Pop. in 1881, 440,572; by census return of 1891, 450,523.

Novatians, in church history, a sect founded in the middle of the 3d century by Novatianus of Rome and Novatus of Carthage, who held that the lapsed might not be received again into communion with the church, and that second marriages are unlawful. Novatianus is said to have suffered martyrdom about 255 A.D. Several writings of his remain.

Nova Zembla (Russian, *Novaia Zemlia*), two large islands in the Arctic Ocean, belonging to Russia, and lying north from the north-eastern corner of European Russia, separated from each other by the narrow strait Matotchk in Shar; length, 635 miles; breadth, 170 miles. The coasts swarm with seals, fish, and water-fowl. The interior is covered with stunted shrubs, short grass, and moss, and is frequented by reindeer, white bears, ermines, and Arctic foxes. It has no permanent inhabitants, but is visited by Russian hunters and fishers.

Novel, a prose narrative of fictitious events connected by a plot, and involving portraitures of character and descriptions of scenery. In its present signification the term novel seems to express a species of fictitious narrative somewhat different from a *romance*, yet it would be difficult to assign the exact distinction, though the former is generally applied to narratives of everyday life and manners; while the romance deals with what is ideal, marvellous, mysterious, or supernatural. Prose fiction written for entertainment is of considerable antiquity. Among the Greeks we find mention of a collection of stories known as the Milesian Tales, before which a sort of historical romance, the Cyropædia, had been produced by Xenophon (445–359 B.C.). There were several other Greek writers of fiction before the Christian era, but the most notable name is that of Heliodorus (which see) in the 4th century after Christ. He was followed by Achilles Tatius and by Longus. Among the Romans the chief names are Petronius Arbiter and Appuleius. The romances of the middle ages were metrical in form (see *Romance*), and the true novel as we at present understand it is of comparatively modern growth. It had its early beginnings in the stories of Boccaccio, contained in his Decameron (1358). The success of this col-

lection gave rise to numberless imitations, and since that time the development of the novel has been steadily progressive. At first we have nothing but tales of love-intrigue, as in the Decameron, in the Cent Nouvelles Nouvelles (15th century), and the Heptameron of Margaret of Navarre (1559). But during the 16th and 17th centuries there is very marked progress, writers beginning very materially to enlarge and vary their sphere; and we now find produced the comic romance, the *picaresque* romance or romance of amusing roguery, and the pastoral romance. The first variety is worthily represented by the Garagantua and Pantagruel of Rabelais (died 1553). Next in point of date comes the Vita di Bertoldo of Julio Cesare Croce, a narrative of the humorous and successful exploits of a clever peasant, which was as popular for two centuries in Italy as Robinson Crusoe in England. Some years after appeared the Don Quixote of Cervantes (1605), which gave the death-blow to the romance of chivalry. About the same time the first of the *picaresque* romances was given to the Spanish public. In this branch Matteo Aleman gives us in Guzman Alfarache a hero who is successively beggar, swindler, student, and galley-slave. It gave birth to a host of similar romances, and is said to have suggested to Le Sage the idea of Gil Blas. The Arcadia of Sir Philip Sydney blends pastoral with chivalrous manners, and marks the transition to the romances of conventional love and metaphysical gallantry. In the 17th century prose fiction in most of its leading types had become an established form of literature in the principal languages of Europe. The full-fledged modern English novel may be said to date from Defoe. The effect of his Robinson Crusoe, Colonel Jack, Moll Flanders, &c., is caused by the delineation and skilful combination of practical details, which give to the adventures the force of realities. The novel of everyday life was further improved by Richardson, Fielding, and Smollett, of whom Richardson and Fielding were the most original and still rank among the masters of English fiction. The Tristram Shandy of Sterne displays admirable character painting, and humour deeper and finer in quality than that of his contemporaries, but can hardly be said to have any plot. Next appeared Goldsmith's Vicar of Wakefield, which possesses a higher moral tone than any that had preceded it. Among the best works of secondary rank may be mentioned Johnson's Rasselas, Walpole's Castle of Otranto, Madame D'Arblay's Evelina, and Beckford's Vathek. Ranking below these are the novels or romances of horrors, represented by the Mysteries of Udolpho and others by Mrs. Radcliffe, M. G. Lewis's Monk, and Maturin's Montorio. A return to stricter realism is manifested in Miss Edgeworth and Miss Austen, who describe domestic life with minuteness, good sense, a clear moral aim, and charming simplicity of style. In France, among the novels treating of social life in the 18th century the most prominent are the Vie de Mariamne and the Paysan Parvenu of Marivaux, Manon l'Escaut by the Abbé Prévot, the Nouvelle Héloise, and the Émile of Rousseau, containing the author's theories of love, education, religion, and society. In the department of humorous and satirical fiction the palm belongs to Le Sage, author of Gil Blas, the Diable Boiteux, &c. As a writer of satirical fiction Voltaire is entitled to high rank by his Candide, Zadig, Princesse de Babylone, &c. The translation of the Arabian Nights' Entertainments by Galland (1704–17) revived the taste for the exaggerations of eastern fiction, and brought a variety of works into the field teeming with genii, magicians, caliphs, sultans, princesses, eunuchs, slaves, &c. In Germany three great names tower above all others—Wieland; Jean Paul Richter, whose works abound in strokes of humour, pathos, and fancy; and Goethe, whose novels are attempts to represent or solve the great problems of life and destiny. Popular romantic legendary tales (Volksmärchen) constitute a special department of German literature, which was successfully cultivated by Ludwig Tieck, De la Motte Fouqué, Chamisso, Clemens Brentano, Zschokke, Hoffmann, Musäus, and others.

In entering upon the present century the first name we meet with is that of the author of Waverley. Sir Walter Scott introduced a new era in the history of English fiction, and may be said to have created the modern historical novel. Since his day the British novelists are perhaps the most numerous class in the list of authors; and among the more prominent we may note Galt, Lady Morgan, Charles Lever, Mrs. Gore, Theodore Hook, Disraeli, Bulwer, Lytton, Dickens, Thackeray, James, Ainsworth, the sisters Brontë, Mrs. Trollope, Anthony Trollope, Mrs. Craik, Kingsley, Marryat, George Eliot, Wilkie Collins, Miss Braddon, Mrs. Oli-

phant, Miss Thackeray, Miss Yonge, Thomas Hughes, Charles Reade, William Black, Thomas Hardy, Richard Blackmore, Walter Besant, W. E. Norris, James Payn, Clark Russell, Christie Murray, Rider Haggard, R. L. Stevenson, George Meredith, and Dr. George Macdonald; besides whom there are a number of clever rising men. In America it was not till after the revolution that the earliest attempts in prose fiction were made. The first notable adventurer in this field was Charles Brockden Brown, who was followed by J. Fenimore Cooper, Washington Irving, Edgar A. Poe, Nathaniel Hawthorne, Harriet Beecher Stowe, and Oliver Wendell Holmes. After these come a younger, and in some respects a more markedly American school, represented by such names as Bret Harte, Henry James, Julian Hawthorne, Cable, Crawford, and Howells. The most celebrated of the French novelists of the present century are Madame de Staël, Châteaubriand, Victor Hugo, Dumas (father and son), Balzac, Alphonse Karr, Georges Sand, Feuillet, Prosper Mérimée, Edmond About, Erckmann-Chatrian, Zola, Daudet, &c. The more noteworthy names in the German literature of fiction are those of Gutzkow, Wilibald Alexis (Wilhelm Häring), Hackländer, Spielhagen, Gottfried and Johanna Kinkel, Auerbach, Rodenberg, G. zu Putlitz, Gustav Freytag, Paul Heyse, Georg Ebers, Rosegger, and others. Among the most important novels in other languages are those in the Italian by Manzoni, in Danish by Hans Christian Andersen, in Swedish by Frederika Bremer and Madame Carlen, in Norwegian by Björnson, in Hungarian by Maurice Jokái, and in Russian by Ivan Tourgueneff and Tolstoï.

Novels, in the civil law, are the supplementary constitutions of some Roman emperors, so called because they appeared after the authentic publications of law made by these emperors.

Novem'ber (from L. *novem*, nine), formerly the ninth month of the year, but according to the Julian arrangement, in which the year begins on 1st January, November became the eleventh month, and comprised 30 days. See *Calendar*.

Nov'gorod, or VELIKI-NOVGOROD (*Great Novgorod*), a town of Russia, capital of the government of same name, on the Volkhov, near the point where it issues from Lake Ilmen, 103 miles S.S.E. St. Petersburg. It was during the middle ages the largest and most important town of Northern Europe. It is divided into two parts by the river, the Kreml or citadel and the trading town. The former contains the cathedral of St. Sophia, built after the model of St. Sophia at Constantinople; besides which there are numerous churches and several monasteries. Novgorod was the cradle of the Russian monarchy, and a monument was erected in 1864 to commemorate the thousandth anniversary of the foundation of the Russian State by Rurik. The trade and manufactures are now unimportant. Pop. 20,599.—The government has an area of 47,236 square miles. It is generally flat, a considerable portion of it being covered with lakes and marshes. The low range of the Valdai Hills enter it in the S.W. and form the principal watershed separating the basin of the Baltic from that of the Volga. The lakes are numerous, and three of them of great extent—Vosje, Bielo-Osero, and Ilmen. A great part of the surface is covered by forests. The principal crops are rye, barley, oats, flax, and hemp. Pop. 1,194,078.

Novi-Bazar', a town of Bosnia, on the Rashka, a tributary of the Morava, 130 miles south-east of Bosna-Serai. It has important fairs, and is in a position of strategic importance. Pop. 12,000.

Novice, a candidate of either sex for a religious order; the *novitiate* being the time in which the novice makes trial of a monastic life before taking the final vows. The term of probation is at least one year, and may extend to two or three. The order is not bound to receive a novice at the end of his novitiate, neither can a novice be hindered to leave the order when the term of novitiate is expired. The age for commencing a monastic life is fixed by the Council of Trent at sixteen years.

Novikoff, NICHOLAI IVANOVITCH, Russian author, born near Moscow in 1744, died 1818. He was for a time in the imperial service, but settling in Moscow he became editor of the Moscow Gazette, and founded the first circulating library in Russia. He published the Old Russian Library, a collection of historical documents; Russian Biographies; a History of the Jesuits (for which he was imprisoned); &c.

Novi Ligu're, a town of North Italy, province of Alessandria, 24 miles N.N.W. of Genoa. It was the scene of a French defeat in 1799. Pop. 9917.

Novo-Moskovsk', a town, Russia, government of Ekaterinoslaff, on right bank of the

Samara. It has important horse and cattle fairs, tanneries, &c. Pop. 17,959.

Novo-Tcherkask' ('New Tcherkask'), the chief town of the country of the Don Cossacks, in S. Russia, on the Aksai, a tributary of the Don, 40 miles from the Sea of Azov. It was founded in 1805, when the inhabitants had to remove from Old Tcherkask, on the banks of the Don, on account of inundations. It is a thriving place with a considerable trade, but the manufactures are unimportant. Pop. 37,091.

Novo-Zybkov, a town of Western Russia, prov. Tchernigov. Pop. 11,924.

Novum Or'ganum ('new instrument'), the second part of Bacon's great projected work the Instauratio Magna, published in 1620. It is written in Latin, and along with the Advancement of Learning forms the foundation of the inductive or Baconian system of philosophy.

Noyades (nwà-yäd; French, from *noyer*, to drown), the name given to the execution of political prisoners by drowning them, practised during the French revolution, especially by Carrier at Nantes. One method adopted was crowding the victims into a boat, withdrawing a plug in the bottom, and casting them adrift.

Noyau (nwà-yō'), a cordial or liqueur of various compositions, but generally prepared from white brandy, bitter almonds, sugar-candy, grated nutmeg and mace, and sometimes further flavoured with orange-peel, the kernels of apricots, peaches, nectarines, &c.

Noyon (nwà-yōn), a town of North-eastern France, in the department of Oise, near the Oise, 44 miles E.N.E. of Beauvais. It is an ancient place, and has a cathedral, begun in the 12th and completed early in the 13th century. Noyon was the birthplace of John Calvin. Pop. 5582.

Nubec'ulæ. Same as *Magellanic Clouds.*

Nubia, a name given, in a more or less restricted sense, to the countries of N.E. Africa bounded N. by Egypt, E. by the Red Sea, S. by Abyssinia, Senaar, and Kordofan, and W. by the Libyan Desert. With the exception of the valley of the Nile the country is generally desert. From 1822 to the revolt of the Mahdi in 1883 the country was subject to Egypt. It now, with Senaar, Kordofan, and other districts, acknowledges the sway of the Mahdi's successor. Suakin or Sauakin, on the Red Sea, is the only practicable port. Remains of ancient edifices occur throughout the whole extent, but chiefly below Dongola. The Nubians belong to the Arabian and Ethiopian races, who converge in the Nile basin: they are a handsome race, of dark-brown complexion, bold, frank, cheerful, and more simple and incorrupt in manners than their neighbours either up or down the river. Their language

Nubians.

is various dialects of the Negro speech of Kordofan. Previous to the rebellion a great transit trade was carried on between Egypt and the interior of Africa by the Nubians. Pop. estimated at 1,000,000 or 1,500,000. The country is still in a disturbed state. See *Egypt*, *Soudan*.

Ñuble (nyö'blā), an inland prov. of Chile, watered by the Ñuble and other streams; area, 3555 square miles. Pop. 149,871.

Nucha, or NUKHA (nö-*hä'*), a town of Russia, in the Caucasian government of Elizabethpol, 120 miles E.S.E. from Tiflis. It contains a fortress and palace built by Hosein Khan in 1765, and was up to 1864 a very important sericultural centre. Pop. 20,917.

Nucleobranchia'ta, a term used synonymously with *Heteropoda* to denote an order of the class of Gasteropodous Mollusca.

Nu'cleus, NUCLE'OLUS. See *Cell.*

Nuddea. See *Nadiyá.*

Nudibranchiata, the section of 'Naked-gilled' Molluscs belonging to the class of Gasteropods. They have no shells in their

adult state, and the gills are completely exposed, existing for the most part as branched or aborescent structures on the

Nudibranchiata—*Eolis olivacea.*

back or sides of the body. The sea-lemons, sea-slugs, &c., are examples.

Nuevo Leon. See *New Leon.*

Nuggi'na. See *Nagina.*

Nuisance, a legal term used to denote whatever incommodes or annoys; anything that produces inconvenience or damage. Nuisances are defined of two kinds—*public* or *common* and *private.* Public nuisances are: annoyances in the highways, bridges, and public rivers; injurious and offensive trades and manufactures, which, when hurtful to individuals, are actionable, and when detrimental to public health or convenience, punishable by public prosecution, and subject to fine according to the nature of the offence. A private nuisance may be defined as an injury or annoyance to the person or property of an individual, and not amounting to a trespass; as where one projects the eaves of his house over those of his neighbour, or stops or obstructs a right of way. Whatever obstructs passage along the public ways, or whatever is intolerably offensive to individuals in their homes, constitutes a nuisance. Causing inconvenience to one's neighbours may not in itself be a nuisance at law; there must be positive discomfort or danger. It is a nuisance if a neighbour sets up and exercises any offensive trade, or keeps noisome animals near the house of another. Nuisance, whether private or public, is rather a tortious than a criminal act. The remedy at law for the injury of nuisance is by action of trespass on the cause, in which the party injured may recover a satisfaction in damages for the injury sustained. The party aggrieved has also the right to abate the nuisance by his own act; that is, he may take away or remove it, provided he commits no riot in so doing, nor occasions (in cases of private nuisance) any damage beyond what the removal of the inconvenience necessarily requires. Says Blackstone: "The reason the law allows this summary method is because injuries of this kind require an immediate remedy, and cannot wait for the slow progress of justice."

Nukahi'va, the chief of the Marquesas Islands (which see).

Nukha (nö-*hä'*). See *Nucha.*

Nullification, a rendering void and of no effect, or of no legal effect; in U.S. politics the doctrine of the extreme states' rights party, first propounded by Calhoun in 1828. He asserted the right of any state to declare the unconstitutionality of any federal law, and the right to withdraw from the Union should such law be enforced. This controversy, though silenced at the time, ended in the secession of the Confederate States and the Civil War.

Nul'lipore, a name given to certain beautiful little plants of the genus *Melobesia,* common on coral islands. From secreting lime on their surface, and hence resembling coral, they were formerly supposed to be a kind of zoophytes.

Numantia, an ancient town of Spain, the site of which is near the town of Soria in Old Castile. It had great natural strength, and is celebrated for its desperate resistance to the Roman power, especially in the siege by Scipio Africanus in B.C. 134–133, when it had to surrender, though most of its defenders then surviving put themselves to a voluntary death. The town was destroyed by the conqueror.

Numa Pompilius, the second king of Rome, who is said to have reigned from 714 to 672 B.C. He was of Sabine origin, and was distinguished as a philosopher and legislator, though, like the other early kings, he has more a legendary than a historical existence. He was regarded as the founder of the most important religious institutions of the Romans, and left writings explanatory of his system, which were burnt by order of the senate when accidentally discovered 400 years after his time.

Number, a single unit considered as part of a series, or two or more of such units. An *abstract number* is a unit or assemblage of units considered independently of any thing or things that they might otherwise be supposed to represent. For example, 5 is an *abstract number* while it remains independent; but if we say 5 feet or 5 miles it becomes a *concrete number. Cardinal numbers* are numbers which answer the question, 'How many?' as one, two, three,

&c., in distinction from *first, second, third,* &c., which are called *ordinal numbers. A prime number* is a number which can be divided exactly by no number except itself and unity. A number is *even* when it is divisible by two, otherwise it is *odd.* See *Arithmetic.*

Number, in grammar, that distinctive form which a word assumes according as it is spoken of or expresses one individual or several individuals. The form which denotes one or an individual is the *singular number;* the form that is set apart for two individuals (as in Greek and Sanskrit) is the *dual number;* while that which refers indifferently to two or more individuals or units constitutes the *plural number.*

Numbering-machine, a machine for impressing consecutive numbers on account-books, coupons, railway-tickets, bank-notes, &c. One of the principal forms of the apparatus consists of discs or wheels decimally numbered on their peripheries, the whole mounted on one axle, upon which they turn freely, acting upon each other in serial order. The first wheel of the series, containing the units, is moved one figure between each impact, and when the units are exhausted the tens come into action and act in coincidence with the units; so on of the hundreds, thousands, &c.

Numbers, Book of, the fourth of the books of the Pentateuch. It takes its name from the records which it contains of the two enumerations of the Israelites, the first given in chaps. i.–iv., and the second in chap. xxvi. It contains a narrative of the journeyings of the Israelites from the time of their leaving Sinai to their arrival at the plains of Moab, and portions of the Mosaic Law. Formerly the authorship was implicitly attributed to Moses, but some modern scholars resolve the book into various parts, to each of which is assigned a separate author. See *Pentateuch.*

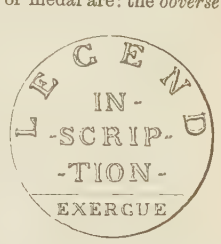
Numeral, a figure or character used to express a number; as the Arabic numerals, 1, 2, 3, &c., or the Roman numerals, I, V, X, L, C, D, M, &c. See *Arithmetic.*

Numeration, the art of expressing in characters any number proposed in words, or of expressing in words any number proposed in characters. The chief terms used for this purpose are the names of the digits from *one* to *ten,* a *hundred,* a *thousand,* a *million,* &c. The term *billion* is of uncertain use: in Britain it is a million of millions; in France, America, &c., a thousand millions.

Numid'ia, an ancient country of North Africa, corresponding roughly with modern Algeria. It was divided among various tribes, but after the second Punic war it was united under Massinissa, and several of its rulers became noted in Roman history. In B.C. 46 it became a Roman province.

Numidian Crane. See *Demoiselle.*

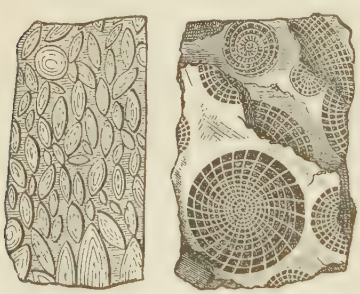
Numismat'ics, or Numismatology, the science of coins and medals, the study of which forms a valuable and important adjunct to that of history. The word *coin* is in modern times applied to those pieces of metal struck for the purpose of circulation as money; while the word *medal* signifies pieces of metal similar to coins not intended for circulation as money, but struck and distributed in commemoration of some person or event. Ancient coins, however, are often termed *medals.* They are of gold, silver, bronze, electrum, or billon, and in ancient times served not only the purposes of a currency, but as chronicles of political events, and abstracts of the times. It is also from coins alone that we derive our knowledge of some of the most celebrated works of ancient art, particularly of ancient statuary. The parts of a coin or medal are: the *obverse* or *face,* containing generally the head, bust, or figure of the sovereign or person in whose honour the medal was struck, or some emblematic figure relating to him; and the *reverse,* containing various figures or words.



The words around the border form the *legend,* those in the middle or field the *inscription.* The lower part of the coin, separated by a line from the figures or the inscription, is the *basis* or *exergue,* and contains the date, the place where the coin was struck, &c. Coins are usually arranged in three grand classes: Greek and Roman coins, mediæval and modern European coins, and Oriental coins. Greek coins are again classed in three divisions: (1) civic coins, and regal without portraits; (2) regal coins bearing portraits; (3) Græco-Roman coins. Roman coins are divided into (1) republican, (2) imperial. In ancient, as in modern times, while the coins of empires or kingdoms were (at least in later times) distinguished by the head of the reigning

prince, those of free states were distinguished by some symbol. Thus, Egypt was distinguished by a sistrum, an ibis, a crocodile, or a hippopotamus; Arabia by a camel; Africa by an elephant; Athens by an owl; Syracuse and Corinth by a winged horse. There were also a number of symbols having a general signification. Thus, a patera signified a libation, and indicated the divine character of the person holding it in his hand; the shaft of a spear denoted sovereign power; an ensign on an altar, a new Roman colony; and so forth. Mediæval coins include the Byzantine, the coins of the various European states from the fall of Rome to the accession of Charlemagne; the Carlovingian currency from Charlemagne to the fall of the Swabian house (1268); early Renaissance to 1450; and classical Renaissance from then till 1600. Modern coins are classed geographically and chronologically. Oriental coins are those of Ancient Persia, Arabia, Modern Persia, India, China, &c.

Nummulite (Latin, *nummus*, money; Greek, *lithos*, stone), a name common to the members of an extensive class of fossil polythalamous foraminifera, having externally somewhat the appearance of a piece of money (hence their name), without any apparent opening, and internally a spiral cavity



Nummulites.

divided by partitions into numerous chambers communicating with each other by means of small openings. They vary in size from less than $\frac{1}{8}$th inch to $1\frac{1}{2}$ inch or more in diameter. Nummulites occupy an important place in geology, on account of the prodigious extent to which they are accumulated in the lower tertiary (Eocene) strata. They are often piled on each other nearly in as close contact as the grains in a heap of corn. They occur so abundantly in some parts of the Eocene formation that the name of *nummulitic* limestone is given to the strata so characterized. This series is characteristic of the Old World, often attains a thickness of many thousand feet, and extends from the western shores of Europe and Africa through Asia to the east of China. The pyramids of Egypt are constructed of a stone largely composed of nummulites.

Nun, a word of unknown origin, but supposed to be connected with a Coptic word signifying 'pure,' applied in the Roman Catholic Church to a female who retires from the world, joins a religious sisterhood, takes upon herself the vow of chastity and the other vows required by the discipline of her convent, and consecrates herself to a life of religious devotion. Nearly all the masculine orders or rules had corresponding feminine institutions, while there were also numerous independent orders of nuns. At present the number of nuns is largely in excess of that of monks. The first nunnery is said to have been that founded by a sister of St. Anthony about A.D. 270; and the first in England was founded at Folkestone by Eadbald, king of Kent, in 630.

Nun, one of the mouths of the river Niger.

Nunc Dimittis ('now thou lettest depart'), the first two words of the Latin version of the canticle of Simeon given in Luke ii. 29–32, and used as the designation of the whole canticle, which forms part of the evening service in the Book of Common Prayer.

Nun'cio, an ambassador of the first rank (not a cardinal) representing the pope at the court of a sovereign entitled to that distinction. A papal ambassador of the first rank, who is at the same time a cardinal, is called a legate. The title of *internuncio* is given to an ambassador of inferior rank, who represents the pope at minor courts. Formerly the papal nuncios exercised the supreme spiritual jurisdiction in their respective districts. But now, in those Catholic kingdoms and states which hold themselves independent of the court of Rome in matters of discipline, the nuncio is simply an ambassador.

Nun'cupative Will, one made by the verbal declaration of the testator, and depending merely on oral testimony for proof, though afterwards reduced to writing. Nuncupative wills are now abolished, but with a proviso that any soldier in actual military service, or any mariner or seaman at

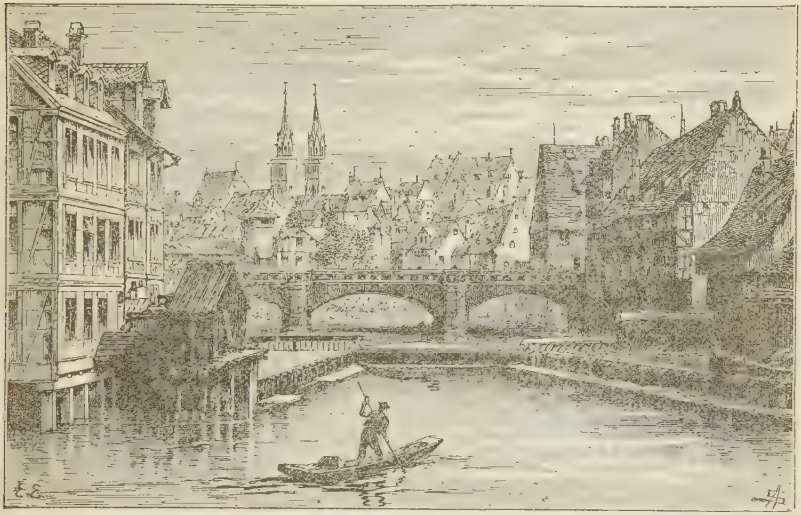
sea, may dispose of his personal estate by an oral testament before a sufficient number of witnesses.

Nuneaton (nun-ē′tn), a town in England, in the county of Warwick, on the left bank of the Anker, 17 miles N.N.E. of the town of Warwick. It has two endowed schools, and the industries include woven worsted goods, wool and skin dressing, iron working, tool-making, &c. The ribbon manufacture, formerly important, has declined. Coal and iron are found in the vicinity. Pop. 8465. It gives name to a parliamentary division of Warwickshire.

Nuñez de Balboa. See *Balboa.*

Nuphar, the generic name of the yellow water-lilies, natural order Nymphæaceæ.

Nuraghi (nụ-rä′gē), the name given to certain ancient structures peculiar to Sardinia, resembling in some respects the



Nuremberg—The Pegnitz and St. Lawrence Church.

'burghs' or 'brochs' (which see) found in some of the northern parts of Scotland. They are conical structures with truncated summits, 30 to 60 feet high and 35 to 100 feet diameter at the base, built of unhewn blocks of stone without mortar. They generally contain two or three conically-vaulted chambers one above the other, connected by a spiral staircase in the thickness of the wall, and are built either on natural or artificial eminences. Their purpose is not known, but they are probably prehistoric monumental tombs.

Nureddin. See *Noureddin.*

Nuremberg (nụ′rem-berg; Ger. *Nürnberg,* nürn′ber*h*), a town in Bavaria, 93 miles N.N.W. of Munich. It is surrounded by well-preserved ancient walls having numerous massive towers and gateways, and the whole inclosed by a dry moat. The walls have of late been breached in several places to afford access from the extensive and rapidly-increasing suburbs. Within the walls it is one of the best-preserved specimens of a mediæval town in existence. The houses are generally lofty and picturesque, and many of them have three ranges of dormer-windows on their steep roofs. The town, which is very densely built, rises gradually to a height on the north side, on which the old castle is situated. The Pegnitz, traversing the town from east to west, divides it into two nearly equal parts—the north, and the south, which communicate by numerous bridges. It contains a large market-place and several interesting churches, among the finest of which are the Gothic churches of St. Lawrence and St. Sebaldus, both dating from the 13th century. The former among other treasures of art contains an elaborate and delicately carved ciborium of stone in the form of a Gothic spire 65 feet

high by Adam Krafft; the latter, St. Sebald's monument, the masterpiece of Peter Vischer, consisting of a rich late Gothic altar shrine and canopy in bronze adorned with numerous statues and reliefs. Other places of worship are the 14th century Marienkirche (Rom. Cath.), and the Jewish synagogue in oriental style (1867–74). The castle dates from the reign of Frederick Barbarossa (1158); part of the interior was fitted up in Gothic style (1854–56) as a royal residence. The Town-hall is adorned with frescoes by Albert Dürer, and a relief in stucco by Kern. The Germanic National Museum, founded in 1852 in a suppressed Carthusian monastery, a Gothic building of the 14th century with extensive cloisters, and recently greatly extended by the addition of the Augustinian monastery rebuilt adjoining, now ranks among the first in Germany, and is exceedingly rich in works illustrative of the arts and industries of the middle ages. It has also a library and a collection of charters. There are several fountains, the chief of which is the Schöne Brunnen, erected in 1385–96, and restored 1821–24. It is in the form of a graceful Gothic cross 63 feet in height, adorned with numerous figures; and modern statues of Dürer, Hans Sachs, Melanchthon, and other worthies. Nuremberg has extensive breweries, railway-carriage and lead-pencil manufactories, and produces fancy articles in metal, carved wood, ivory, &c., toys, chemicals, clocks and watches, cigars, playing-cards, &c. Printing and bookbinding are also extensively carried on, and the hop-market is the most important on the Continent. The town is celebrated, in connection with its industry, for the invention of watches. It was an independent imperial town down to 1806, when it became a Bavarian city. It was one of the first of the imperial towns to cast its lot for the Reformation. During the Thirty Years' war about 10,000 of the inhabitants perished, while Gustavus Adolphus was besieged here by Wallenstein (1632). Before the discovery of the sea passage to India, Nuremberg was the great mart of the produce of the East coming from Italy and going to the North. Several causes led to a decline; but since it became a Bavarian city it has prospered greatly, and is now the most important seat of trade and manufactures in South Germany. Pop. 142,403, three-fourths being Protestants.

Nurse, one who tends or takes care of the young, sick, or infirm; specifically a female hospital attendant. There are now numerous institutions where active, intelligent, and physically able women are thoroughly trained for this work. The system of sending trained nurses to a seat of war originated with Miss Florence Nightingale during the Crimean war, and organizations for military nursing during war are now common to all civilized countries. See *Red Cross*.

Nursery, a place where vegetables, flowering plants, and trees are raised from seed in order to be sold in their young state either for use as food or for transplantation. The advantage of having separate places devoted to this purpose consists in this, that more attention can in that case be given to the objects of culture at the time when particular care is required by them. In the case of trees there is another great advantage in the fact that they can be selected from the nursery at a stage of their growth at which it can be pretty satisfactorily determined that they are likely to thrive. Nurseries are parcelled out into several plots according to the different kinds of plants or trees to be raised. One part is assigned to the ordinary culinary vegetables; others to flowering plants requiring different kinds of soil; another to forest trees with caducous leaves; another to ornamental trees and shrubs with caducous leaves; another to trees and shrubs with persistent leaves; and another to fruit-trees. For the propagation of many exotic and other trees and plants a large extent of ground in a well-appointed nursery is under glass. Sometimes also different parts of the nursery are allotted to the various operations, such as budding and grafting, by which trees are propagated.

Nursingpore. See *Narsinghpur*.

Nusseerabad. See *Nasirabad*.

Nut, in botany, a one-celled fruit containing when mature only one seed, and enveloped by a pericarp of a hard, woody, or leathery texture, rarely opening spontaneously when ripe. Among the best known and most valuable nuts are the hazel-nut, the Brazil-nut, the walnut, chestnut, and cocoa-nut, all of which are edible. Various other kinds of nuts are used for special purposes. Thus valonia-nuts, gall-nuts (not, strictly speaking, nuts—see *Galls*), and myrobalan-nuts are used in tanning and dyeing, the last two also in ink-making; betel-nuts in making tooth-powder and tooth-paste; and coquilla-nuts and vegetable-

ivory (the kernel of the nut of the Peruvian palm), being very hard and capable of taking on a fine polish, are used in making small ornamental articles of turnery.

Nutation, in astronomy, a small subordinate gyratory movement of the earth's axis, in virtue of which, if it subsisted alone, the pole would describe among the stars, in a period of about nineteen years, a minute ellipse, having its longer axis directed towards the pole of the ecliptic, and the shorter, of course, at right angles to it. The consequence of this real motion of the pole is an apparent approach and recess of all the stars in the heavens to the pole in the same period; and the same cause will give rise to a small alternate advance and recess of the equinoctial points, by which, in the same period, both the longitudes and right ascensions of the stars will be also alternately increased or diminished. This nutation, however, is combined with another motion, viz. the precession of the equinoxes, and in virtue of the two motions the path which the pole describes is neither an ellipse nor a circle, but a gently undulating ring; and these undulations constitute each of them a nutation of the earth's axis. Both these motions and their combined effect arise from the same physical cause, viz. the action of the sun and moon upon the earth. See *Precession*.

Nut'cracker, the name of an insessorial bird rarely seen in Britain. It is generally referred to the crow family, and so placed as to approximate either to the woodpeckers or starlings. The *Nucifrăga caryocatactes*, or European nutcracker, is about the size of the jackdaw, but with a longer tail. It combines to a considerable extent the habits of the woodpeckers and those of the omnivorous birds. It has received the name of nutcracker from its feeding upon nuts. The *N. columbiana*, noted for the diversified beauty of its plumage, frequents rivers and sea-shores in America.

Nutgalls. See *Galls*.

Nut'hatch, the common name of birds of the genus *Sitta*. The common European nuthatch (*S. europæa*) is a scansorial bird, of shy and solitary habits, frequenting woods and feeding on insects chiefly. It also eats the kernel of the hazel-nut, breaking the shell with great dexterity. The white-bellied nuthatch of North America (*Sitta Carolinensis*) is 6 in. long; the wings 4.

Nutmeg, the kernel of the fruit of *Myristica moschāta* or *fragrans*. This fruit is a nearly spherical drupe of the size and somewhat of the shape of a small pear. The fleshy part is of a yellowish colour without, almost white within, and 4 or 5 lines in thickness,

Nutmeg (*Myristica moschāta*).

and opens into two nearly equal longitudinal valves, presenting to view the nut surrounded by its arillus, known to us as *mace*. The nut is oval, the shell very hard and dark-brown. This immediately envelops the kernel, which is the nutmeg as commonly sold in the shops. The tree producing this fruit grows principally in the islands of Banda in the East Indies, and has been introduced into Sumatra, India, Brazil, and the West Indies. It reaches the height of 20 or 30 feet, producing numerous branches. The colour of the bark of the trunk is a reddish-brown; that of the young branches a bright green. The nutmeg is an aromatic, stimulating in its nature, and possessing narcotic properties, very grateful to the taste and smell, and much used in cookery. Nutmegs yield by distillation with water about 6 per cent of a transparent oil having a specific gravity ·948, an odour of nutmeg, and a burning, aromatic taste.

Nu'tria, the commercial name for the skins of *Myapotămus coypus*, the coypou of S. America. The overhair is coarse; the fur, which is used chiefly for hat-making, is soft, fine, and of a brownish-ash colour.

Nutrition, the act or process by which organisms, whether vegetable or animal, are able to absorb into their system their proper food, thus promoting their growth or repairing the waste of their tissues. It is the function by which the nutritive matter already elaborated by the various organic actions loses its own nature, and assumes that of the

different living tissues—a process by which the various parts of an organism either increase in size from additions made to already formed parts, or by which the various parts are maintained in the same general conditions of form, size, and composition which they have already by development and growth attained. It involves and comprehends all those acts and processes which are devoted to the repair of bodily waste, and to the maintenance of the growth and vigour of all living tissues.

Nux-vomica, the fruit of a species of *Strychnos* (*S. nux-vomica*), order Loganiaceæ, growing in various places in the East Indies. It is about the size and shape of a small orange, and has a very bitter acrid taste. It is known as a very virulent poison, and is remarkable for containing the vegeto-alkali *strychnia*. See *Strychnine*.

Strychnos nux-vomica.

Nyam-Nyam. See *Niam-Niam*.

Nyan'za. See *Albert Nyanza* and *Victoria Nyanza*.

Nyas'sa, a large lake in South-eastern Africa, out of which flows the Shiré, a northern tributary of the Zambesi; discovered by Livingstone in 1859. The length of the lake is above 300 miles, and it varies in breadth from about 15 to more than 50 miles. The surface is 1522 feet above the sea-level; its waters are sweet and abound in fish. There are missionary stations (see *Livingstonia*, *Blantyre*) and trading stations in this region, and a road has been constructed between Nyassa and Tanganyika. Recently trade and missionary enterprise have been much disturbed by the proceedings of the Arab slave-hunters.

Nya'ya, a system of Indian philosophy said to have been propounded by a sage named Gautama (not the founder of Buddhism). He lived at the commencement of the second of the four ages into which the Hindus divide the whole duration of the world's existence, and his life is represented as lasting 1000 years. His philosophy inquires into the way to attain perfect beatitude, or the final deliverance of the soul from re-birth or transmigration.

Nyborg (nü'bor*h*), a seaport in Denmark, on the east side of the island of Fünen, 17 miles E.S.E. of Odensee. It was fortified until 1869. Pop. 5402.

Nyctagina'ceæ, NYCTAGIN'EÆ, a nat. ord. of plants inhabiting the warmer parts of the world, typical genera of which are the *Mirabilis* or marvel of Peru (see *Mirabilis*), *Abronia*, and *Pisonia*. The roots of many of the species are fleshy, purgative, and emetic.

Nyctice'bus, the generic name of the kukang or slow-paced loris, the typical animal of the sub-family Nycticebidæ.

Nyctipithe'cus, a genus of American monkeys which appear to represent the lemur tribe in America. Their habits are nocturnal and their movements cat-like.

Nyiregyhaza (nyē'red-yä-zà), a town of Hungary, 30 miles N. of Debreczin. There are mineral springs in the neighbourhood, and it has salt, soda, and saltpetre manufactories. Pop. 24,102.

Nyköping (nü-cheup'ing), a seaport town in Sweden, capital of Södermanlän, and at the mouth of the river Nyköping, on the Baltic, 54 miles S.W. of Stockholm. It has ship-building and several minor industries. Pop. 5374.

Nylghau, the *Portax picta* or *tragocamēlus*, a species of antelope as large as or larger than a stag, inhabiting the forests of Northern India, Persia, &c. The horns are short and bent forward; there is a beard under the middle of the neck; the hair is grayish-blue. The female has no horns. The nylghau is much hunted as one of the noblest beasts of the chase, the skin of the bull being in demand for the manufacture of native shields. The name nylghau literally means 'blue ox,' and has, doubtless, been applied to this animal from the ox-like proportions of its body. They are known to breed freely in confinement.

Nymegen. See *Nijmegen*.

Nymph, a term sometimes applied to denote the *pupa* or *chrysalis* stage in the metamorphosis of insects and other animals.

Nymphæa'ceæ, a nat. order of aquatic plants containing the water-lilies of various parts of the world. They are polypetalous hypogenous exogens, with the sides of the cells of the fruit covered with numerous seeds. The leaves are peltate or cordate and fleshy; the stalks both of flowers and leaves vary according to the depth of the water on the top of which the leaves float. The stems are bitter and astringent, and the seeds,

which taste like those of the poppy, may be used as food, and hence the Victoria Regia is called water-maize in South America. The

Nymphæa Lotus (white Egyptian water-lily).

species are mostly prized for the beauty of their flowers; as the *Nymphæa alba*, or white water-lily which grows in pools, lakes, and slow rivers in Britain; the *N. cærulea* or blue lotus of the Nile, often cultivated in gardens; the *N. Lotus*, or white lotus of the Nile; the *Nuphar lutĕa*, or yellow water-lily; and the *Victoria Regia*.

Nymphs, in mythology, a numerous class of inferior divinities, imagined as beautiful maidens, not immortal, but always young, who were considered as tutelary spirits not only of certain localities, but also of certain races and families. They occur generally in connection with some other divinity of higher rank, and they were believed to be possessed of the gift of prophecy and of poetical inspiration. Those who presided over rivers, brooks, and springs were called *Naiads;* those over mountains, *Oreads;* those over woods and trees, *Dryads* and *Hamadryads;* those over the sea, *Nereids.*

Nynee Tal. See *Naini Tal.*

Nystad, a town and seaport in Finland, 36 miles N.W. of Åbo, on the Gulf of Bothnia. A peace was concluded here between Russia and Sweden in 1721. Pop. 3837.

O.

O, the fifteenth letter and the fourth vowel in the English alphabet. In English O represents six or seven sounds and shades of sound: (1) as in *note, go,* &c. (2) The similar short sound as in *tobacco.* (3) The sound heard in *not, gone.* (4) The same sound lengthened as in *mortal.* (5) The sound in *move, do, tomb, prove.* (6) The same sound but shorter as in *wolf, woman.* (7) The sound of *u* in *tub,* as in *come, done, love.* It is also a common element in digraphs, as *oo, oa, ou.*

O', in Irish proper names, a patronymic prefix corresponding to the Mac of the Highlands of Scotland; thus O'Connell means 'the son of Connell.'

O'ahu, one of the Sandwich Islands (which see).

Oajaca, or OAXACA (ō-å-hä'kä), a state of Mexico, on the Pacific Ocean and the Gulf of Tehuantepec; area, 35,582 square miles. It is of uneven surface, and in many parts mountainous; but is one of the most beautiful and best-cultivated districts in Mexico. Among the minerals are gold, silver, copper, quicksilver, iron, &c. Wheat, maize, indigo, cochineal, cotton, sugar, cocoa, coffee, and many fruits are produced. The only port is Huatulco. The inhabitants are chiefly Indians. Pop. 806,845.—The capital, which has the same name, stands near the river Verde, 218 miles S.S.E. of Mexico, 4800 feet above the sea. It is well-built, about 2 miles in length by 1¼ mile in breadth, including the suburbs, which are full of gardens and plantations of cochineal. The inhabitants are industrious, manufacturing silk, cotton, sugar, and chocolate. Pop. 28,000.

Oak, the general name of the trees and shrubs belonging to the genus *Quercus*, nat. order Cupuliferæ, having monœcious flowers, those of the males forming pendulous catkins, those of the females solitary or in clusters, and having an involucre which forms the well-known 'cup' of the fruit—the acorn. The oak from the remotest antiquity has obtained a pre-eminence among trees, and has not unjustly been styled the 'monarch of the woods.' In the traditions of Europe and a great part of Asia the oak appears as a most important element in religious and civil ceremonies. It was held sacred by the Greeks and Romans, and no less so by the ancient Gauls and Britons. The species of oak are very numerous, generally natives of the more temperate parts of the northern hemisphere, but found also in Java, Mexico, and S. America. They have alternate simple leaves, which are entire

in some, but in the greater number variously lobed and sinuated or with margins entire, but not generally toothed. The British oak (*Q. Robur*) is found in two forms or varieties, by some regarded as distinct species—*Q. sessiliflora* and *Q. pedunculata*: the wood of the former is heaviest and toughest, that of the latter being in favour with cabinet-makers for ornamental work. (See also *Pyrenaut*.) For more than a thousand years British ships were mainly built of common oak (*Q. Robur*). The common oak attains a height of from 50 to 100 or even 150 feet, with a diameter of trunk of from 4 to 8 feet. Noble specimens of oak-trees, and some of them last in any considerable number in almost all parts of Britain, but are much more frequent in England than in Scotland. The oak subserves a great number of useful purposes, the wood being hard, tough, tolerably flexible, strong without being too heavy, not readily penetrated by water. Among the other chief species are the Black American oak (*Q. tinctoria*), the wood of which is used for turning, and whose bark yields a yellow dye; dyer's oak (*Q. coccifera*), the bark of which is used for tanning and dyeing leather; red oak (*Q. rubra*), the cork oak (*Q. Suber*), live oak (*Q. virens*), the Turkey oak (*Q. Cerris*) furnishing a valuable timber: the valonia oak (*Q. Ægilops*) whose acorn-cups are largely used in tanning, the knoppern oak (*Q. macrolepis*), the Dalmatian oak (*Q. Aegilops*), the Dalmatian oak (*Q. Aegilops*), the Dalmatian oak (*Q. Aegilops

Oa'sis, originally the name of the fertile spots in the Libyan Desert where there is a spring or well and more or less vegetation, but now applied to any fertile tract in the midst of a waste, and often used figuratively. The oases of Northern Africa are generally river valleys, the waters of which are for the most part underground, or depressions surrounded by short ranges of hills, from which small brooks descend, sometimes forming a lake in the centre. In recent times oases have been formed in the Northern Sahara by sinking artesian wells. There are many important oases in the Western Sahara, in the Libyan Desert, in Arabia, Persia, and in the Desert of Gobi in Central Asia. In ancient times the most celebrated oasis was that to the west of Egypt, containing the temple of Jupiter Ammon, now called the Oasis of Siwah. See *Egypt*, *Sahara*.

Oat, or OATS (*Avēna*), a genus of edible grasses cultivated extensively in all temperate climates, and though principally grown as food for horses largely used when ground into meal as human food. There are about sixty species, the principal of which are *A. sativa* (the common oat), *A. nuda* (naked oat, pilcorn, or peelcorn), *A. orientālis* (Tartarian or Hungarian oat), *A. brevis* (short oat), *A. strigōsa* (bristle-pointed oat), *A. chinensis* (Chinese oat), &c. The cultivated species of oats are subdivided into a large number of varieties, which are distinguished from each other by colour, size, form of seeds, quality of straw, period of ripening, adaptation to particular soils and climates, and other characteristics. The yield of oats varies from 20 bushels to 80 bushels per acre according to soil, &c. The weight per bushel varies from 35 to 45 lbs., and the meal product is about half the weight of the oats. Oatmeal is a cheap and valuable article of food, and its value seems to be becoming more appreciated among the wealthier classes as it is being neglected by the poorer. The wild oat (*A. fatua*) is supposed to be the original of all the species, but its native country is unknown.

Oates (ōts), TITUS, son of a ribbon weaver, born in London about 1620, died 1705. He took orders in the Church of England, and held benefices in Kent and Sussex; became afterwards chaplain in the navy and was discharged for misconduct; turned Roman Catholic, and resided for some time at the Jesuit College of Valladolid and St. Omar, but was finally, in 1678, dismissed for repeated misdemeanours. Flung into the world as a mere adventurer he returned to England and concocted the story of the famous 'Popish Plot' (which see). Various events gave colour to the accusation, and in the public excitement created by the story several eminent Catholics were executed, while Titus Oates was lodged handsomely in Whitehall, and received a pension of £900 from parliament. The effects of this perjury continued for two years until, after the execution of Strafford, there was a revulsion of public opinion. He was afterwards convicted of perjury, sentenced to be pilloried five times a year, whipped from Aldgate to Newgate, and imprisoned for life. On the accession of William and Mary he was liberated, and lived to a good old age, enjoying an ill-deserved pension of £300 a year.

Oath, a solemn assertion or promise, with the invocation of God to be a witness of the truth of what we say. Various forms have been associated with oath-taking. Thus, men have proclaimed and symbolized their promise by chopping a fowl in two, by standing within a circle of rope, by placing the hand under another's thigh, by dipping weapons into or drinking blood, or by stretching the hand upwards towards the sky, and this latter gesture has established itself throughout Europe. Amongst the early Christians the question of oath-taking was a matter of much controversy, objection to it being founded upon Christ's command of 'Swear not at all' (Matt. v. 34); but this injunction was held by Athanasius and others only to prohibit colloquial as distinct from judicial swearing. This objection is still maintained, however, by Mennonites, Quakers, Anabaptists; and the Secularists in England, upon other grounds, refuse the judicial oaths. Oaths to perform illegal acts do not bind, nor do they excuse the performance of the act. In civil law, oaths are chiefly divided into two classes—assertory or affirmative oaths (*juramenta assertoria*), establishing the certainty of a present or past event, and promissory oaths (*juramenta promissoria*), which refer to a future event, a promise to execute some contract or undertaking. The laws of all civilized countries require the security of an oath for evidence given in a court of justice, and on other occasions of high importance. Any person called as a witness, or required or desiring to make an affidavit or deposition, who shall, from

conscientious motives, refuse to be sworn, may obtain from the court, on its being satisfied of the sincerity of the objection, permission to make a solemn affirmation or declaration instead. See *Affirmation, Perjury.*

Oaxaca. See *Oajaca.*

Ob. See *Obe.*

Obadi'ah, one of the twelve minor prophets, who foretells the speedy ruin of the Edomites. The prophecy was probably uttered during the period which elapsed between the fall of Jerusalem (586 B.C.) and the conquest of Edom by Nebuchadnezzar (583 B.C.).

O'ban, a seaport of Scotland, county of Argyle, situated on a large protected bay 92 miles from Glasgow and 493 miles from London by rail. It is the terminus of a railway, the starting-place for steamer routes, and the headquarters of tourists to the Western Highlands. It is one of the Ayr district of parliamentary burghs. Pop. 4046.

Obbliga'to. See *Obligato.*

Obdorsk, a fishing town in Asiatic Russia, near the mouth of the Obe; the projected terminus of a railway across the northern part of the Urals to the Arctic Ocean.

O'be, O'BI, or OB, a river of Siberia, which, rising in the Altai Mountains, pursues a very circuitous course north-west to Samarova, and there dividing, flows north in a double channel to the Gulf of Obe. Its chief tributaries are the Irtish, Tobol, Tom, and Tchulim. Its course is estimated at 2000 miles.

Obe'ah, or OBI, a species of witchcraft practised among negroes of the West Indies. The practiser of this form of degraded superstition is called an Obeah-man or -woman, and possesses great influence.

Obeid (o-bīd'), EL, an African town, the capital of Kordofan, 220 miles south-west of Khartoom. The inhabitants carry on a large trade in gum, ivory, gold, &c. Pop. estimated at 20,000.

Ob'elisk, a column of a rectangular form, diminishing towards the top, generally terminating in a low pyramid. The proportion of the thickness to the height is nearly the same in all obelisks, that is, between one-ninth and one-tenth; and the thickness at the top is never less than half, nor greater than three-fourths of the thickness at the bottom. Egypt abounded with obelisks, which were always of a single block of hard stone; and many have been removed thence to Rome and other places. They seem to have been erected to record the honours or triumphs of the monarchs. The two largest obelisks were erected by Sesostris in Heliopolis; the height of these was 180 feet. They were removed to Rome by Augustus. A fine obelisk from Luxor was erected in Paris in 1833, and the two known as Cleopatra's Needles are now in London and New York. (See *Cleopatra's Needles.*) Besides those of Egypt, monoliths of this appearance, but smaller in size, have been found in the ruined cities of Nineveh and Nimrūd. The obelisks which were common to Rome, Florence, &c., had all been removed from Egypt during its domination by the Roman emperors.

Ob'elus, a mark, usually of this form ——, or this ÷, in ancient MSS. or old editions of the classics, and indicating a suspected passage or reading.

Oberam'mergau, a village in Upper Bavaria, celebrated for the performance, every ten years, of the passion-play of Christ's crucifixion and ascension. The performance takes place every Sunday during the summer, on a large wooden stage open to the sky, and it usually lasts eight hours. Primarily regarded by these Bavarian villagers as a religious exercise, it has become in their performances a mystery play of impressive beauty. Latterly, however, it has taken the character of a European amusement and a source of profit.

Oberhausen (ō'bêr-hou-zn), a town of Prussia, in the Rhine province, 51 miles east of the Rhine and 20 north of Düsseldorf, now an important centre of the iron industry, having also coal-mines, chemical-works, porcelain and glass works, &c. Pop. 20,371.

Oberlahnstein (ō-bêr-län'stīn), a town of Prussia, district of Wiesbaden, at the junction of the Lahn with the Rhine, an interesting old place with well-preserved walls, towers, &c. Pop. 5833.

O'berlin, JOHANN FRIEDRICH, Lutheran minister, born at Strasburg 1740, died 1826. He became pastor of Waldbach in the Steinthal (Ban de la Roche) district of Alsace in 1767, and set about ameliorating the wretchedness of the district and the people. Despite opposition he gradually effected a wonderful improvement in the morals, industry, and thrift of the community. Besides agriculture, Oberlin introduced straw-plaiting, spinning, and weaving into the community, so that the village of a few hundreds became a town with 5000 inhabi-

tants, and a model to great numbers of philanthropists.

Oberlin College, an educational institution for both sexes at Oberlin, Ohio, U.S., comprising a preparatory department, a ladies' department, a department of arts and philosophy, and a theological department. The attendance averages from 1200 to 1500.

O'beron, in popular mythology, a king of the elves or fairies, and husband of Titania. He appears first in the old French poem Huon of Bordeaux, but is best known from Shakspere and from Weber's opera of Oberon.

Oberstein, an old town of Western Germany in the principality of Birkenfeld, 28 miles south-west from the Rhine at Bingen, picturesquely situated on the Nahe. Cutting and polishing of agates is a speciality of the place. Pop. 4974.

Obesity. See *Corpulence.*

Obiter dictum (L.), a saying by the way, and applied specifically in law to the casual opinion of a judge in contradistinction to a *judicial dictum.*

Object, in philosophy, the correlative of subject, a term used to represent the distinction between the mind, or agent, or conscious being, or whatsoever it is conceived to be that thinks (the subject), and that, whatsoever it is, that is thought of (the object). The terms subject and object were first introduced in their modern relation in scholastic philosophy, and the distinction between them was at first merely logical. *Object*, in grammar, is the word or member of a sentence or clause expressing that on which the action expressed by a transitive verb in the sentence or clause is exercised, or the word or member governed by a preposition, the word being thus put in the *objective case.*

Object-glass, in a telescope or microscope, the lens which first receives the rays of light coming directly from the object, and collects them into a focus. In the finest refracting telescopes the object-glass consists of an achromatic combination of lenses, formed of substances having different dispersive powers, and of such figures that the aberration of the one may be corrected by that of the other. The substances chiefly used are crown-glass and flint-glass.

Objective. See *Object.*

Obla'ti, or OBLATES, a name given from an early period in the Roman Catholic Church to children dedicated to the church, and now applied to such persons as associate themselves like monks or nuns but without taking vows. Under the name of Oblati of St. Ambrose a congregation of secular priests was established at Milan in 1578 by St. Charles Borromeo. The Oblates of Mary Immaculate, or of the Immaculate Conception, were founded in 1815, at Aix, by the Abbé Mazenod. Their duties were to consecrate themselves to parochial missions in their dioceses; to spiritual ministrations, especially to the young, to the poor, and to prisoners. The order has houses or missionary establishments in France, England, Scotland, and the United States.

Obligation is a term in law which describes the bond under which a person binds himself to pay within a certain time and in the breaking of which a penalty is involved; or the tie in general by which a person is legally bound to the performance of anything.

Obliga'to, or OBBLIGATO (Ital. 'required'), in music, a part or accompaniment in a composition for a particular instrument of such character and importance that it is indispensable to the proper performance of the piece.

Obock', a port and territory belonging to France on the African coast of the Gulf of Aden, near the entrance to the Red Sea. Total pop. 22,370.

Oboe.

Oboe (ō'boi), a musical wind-instrument resembling a clarionet in shape, and sounded through a double reed. It consists of three joints besides the mouthpiece, and its compass is generally from B below the treble clef to F in alt, with the intermediate semitones, being a compass of two octaves and one fifth. The name oboe is from the Italian; the French form, *hautboy* (*hautbois*), was formerly more frequently used.

Ob'olus, a small coin of ancient Greece,

Brass Obolus of Metapontum. A, Actual diameter of coin.

latterly of silver, the sixth part of an Attic drachma, equal to 1¼*d.*; multiples and sub-

multiples of this coin were also used, and pieces of the value of 5, 4, 3, 2, 1½ oboli, and ½, ⅓, ¼th of an obolus respectively are to be found in collections.

O'Brien, WILLIAM SMITH, Irish nationalist, born 1803, died 1864. He entered parliament in 1826, and subsequently joined the Young Ireland group of politicians, and advocated the use of physical force. In an endeavour (1848) to effect a rising in Tipperary, he was surrounded, arrested, tried by special commission at Clonmel, and sentenced to death, but in the end this was commuted to transportation. He was set at liberty in 1854, and fully pardoned in 1856.

Obscene Books and Pictures. Acts as passed by the Legislatures of the several States of the Union give summary power for searching of houses where obscene books, prints, &c., are suspected of being kept, and for the seizure and destruction of such books, &c. The sale, or procuring of them with intent to sell, is a misdemeanour, punishable by fine or imprisonment.

Obscur'antism, a word derived from Germany, where it was originally used at the time of the revival of learning, to signify opposition to progress and enlightenment. Those who opposed all innovation were called *Obscurants.*

Obser'vants. See *Franciscans.*

Observatory, a building devoted to the observation of astronomical, magnetic, meteorological, or other natural phenomena. The astronomical observatory is the one of most general interest. Astronomical observation began at an early date in China; the pyramids in Egypt seem in some way to have been associated with stellar observation; and the first historical observatory was founded in Alexandria 300 B.C. Its work was begun by Aristillus, and continued by Timocharis, Hipparchus, Aristarchus, and others. The first European observatory was built at Nuremberg by Bernhard Walther in 1472, and this was followed in the 16th century by Tycho Brahe's famous observatory on the island of Hveen near Copenhagen, while another was erected by the Landgrave of Hesse at Cassel in 1561. Through the labours of Brahe practical astronomy became associated with the universities, so that Leyden and Copenhagen founded observatories. These were followed by the construction of the Royal Observatory at Paris (1667), the Greenwich Royal Observatory (1675), the Tusculan Observatory near Copenhagen (1704), Berlin (1705; new observatory 1835), Vienna (1756), Dublin (1785), Königsberg (1813), Sydney (1820), Cape of Good Hope (1820), Edinburgh (1825), Pulkova near St. Petersburg (1839), Cambridge, U.S. (1839), Washington, U.S. (1845), Melbourne (1853), Lick Observatory, California (1888). The chief instrument used in the observatory is the telescope, whether in the form of the equatorial or in the mural circle and transit instrument, together with the sidereal and the solar clock. In the larger observatories the application of spectrum analysis, photography, photometry, &c., has greatly increased the number and variety of observations. The observatory building must be constructed in a very stable manner, and as the instruments must be out of contact with the walls they are attached to stone pillars that rest on foundations separate from the rest of the building.

Obsid'ian, vitreous lava, or volcanic glass, lava which has become glassy by rapid cooling, generally placed among the felspars. Obsidian consists of silicate of alumina with iron, and lime or potash or soda according to the species of felspar involved. In Mexico and Peru cutting weapons and rings were manufactured out of it. See *Pumice* and *Pitchstone.*

Obstetrics. See *Midwifery.*

Ocari'na, a musical wind-instrument of clay, of clumsy shape, pierced with a number of small holes, and giving a sweet tone.

Occam, WILLIAM OF, a scholastic philosopher, born at Ockham, in Surrey, about 1270; died at Munich 1347. He is said to have studied at Merton College, Cambridge, and also to have attended the lectures of Duns Scotus in Paris. He held several benefices in England, but entering the order of the Cordeliers, the latter and more distinguished part of his life was passed on the Continent. In 1322 he attended a general assembly of Franciscans at Pérouse, and there asserted the independence of princes in temporal affairs, and denounced the vices of the pope. For this he was condemned by the Council of Avignon, and being compelled to flee from Paris (1328) he took refuge with Louis of Bavaria. Occam is entitled *Doctor singularis et invincibilis,* and is noted as the philosopher who gave the final blow to the Realism of the middle ages, and perhaps the first effective blow to the pope's authority.

Occasional Causes, in metaph., a term employed by the Cartesians to explain the

mode of communication between mind and matter. The soul being a thinking substance, and extension being the essence of body, no intercourse can take place between them without the intervention of the First Cause. It is Deity, therefore, who, on the occasion of certain modifications of our minds, excites the corresponding movements of body; and, on the occasion of certain changes in our body, awakens the corresponding feelings in the mind.

Occident, the western quarter of the hemisphere, so called from the decline or setting of the sun; the west: used in contradistinction to *orient*.

Occultation is the term used in astronomy for the hiding of a star or planet from our sight by passing behind some other of the heavenly bodies, and specifically applied to the eclipse of a star or planet by the moon. The word denotes also the time during which a star or planet is so hidden from our sight.

Occupancy, in law, the taking possession of a thing not belonging to any person, and the right acquired by such taking possession.

Ocean, or SEA, the vast body of water which covers more than three-fifths of the surface of the globe. Although no portion of it is completely detached from the rest, the ocean has often been divided into several great basins or areas, viz. the Pacific Ocean, which separates Asia and Australia from America; the Atlantic Ocean, which separates America from Europe and Africa; and the Indian Ocean, which intervenes between Africa and Australia; together with the Arctic and the Antarctic Oceans, round the north and south poles respectively. Between these no very definite limits can be drawn; thus it is impossible to say where the Atlantic or the Pacific ends and the Antarctic or Southern Ocean begins. The bed of the ocean appears to present the same irregularities as the surface of the land, being diversified by rocks, mountains, plains, and deep valleys. The deepest soundings at present known are 4655 fathoms (north-east of Japan), 4561 fathoms (north of Porto Rico), 4475 fathoms (south of the Ladrone Islands). (See *Atlantic Ocean*, *Pacific Ocean*, &c.) The waters of the ocean vary as greatly in temperature as they do in depth. This is partly due to the ordinary effects of isolation; but the abrupt changes and anomalous distribution of temperature is chiefly owing to currents. (See *Currents, Marine.*) The Pacific and Indian Oceans are both warmer in low latitudes than the Atlantic, and the mean temperature of the equatorial areas at the surface is assumed to be 81°·5; the warmth of the North Atlantic is anomalous, and due to the influence of the Gulf Stream. This high temperature only applies to the surface water of the ocean, for experience shows that in both hemispheres and in all latitudes the basic water of the ocean is exceedingly cold. In low latitudes water at 32° has been drawn from great depths; while in high latitudes water at 26° has been found. This phenomenon is accounted for by the supposition that the cold water at the poles, by reason of its specific gravity, sinks to the bottom and spreads throughout the ocean basin. The saltness of the ocean is due to the presence of various saline ingredients (chiefly chloride of sodium or common salt), which are generally found in the proportion of from 30 to 40 per thousand. Recent observations have shown that the colour and transparency of the water of the ocean are in a large measure dependent on the degree of saltness. In general it is found that the greater the saltness the greater the transparency, and also that where the saltness is very great the water is of a dark-blue colour, that where it is less the water is of lighter blue, inclining to green, and that in the neighbourhood of rivers (where the saltness is reduced to a minimum) the water is as a rule of a greenish-yellow.

Ocea'nia includes all the islands of the Pacific between Asia on the north-west, the Indian Ocean on the west, the Antarctic Ocean on the south, and America on the north and east. It is usually divided into Australasia, Polynesia, and Malasia or the Malay Archipelago.

Oce'anus, in Greek and Roman mythology, the eldest of the Titans, regarded as the god of the ocean or the river surrounding the earth, and the parent of the Oceanides or ocean nymphs.

Ocel'lus, one of the minute simple eyes of insects, many echinoderms, spiders, crustaceans, molluscs, &c. In insects these ocelli or stemmata are usually situated on the crown of the head between the great compound eyes, whose simple elements they resemble in structure, and in rare cases may be the sole organs of vision.

O'celot (*Felis pardālis*), a digitigrade carnivorous mammal of the cat kind peculiar to the American continent. It attains

a length of about 3 feet, while the tail measures some 18 inches more. The ocelot inhabits great forests; its food consists mainly

Ocelot (*Felis pardalis*).

of birds and rodents; and it is timid but bloodthirsty.

Ochil Hills (ō'kil), a hill range of Scotland, on the borders of Perth, Clackmannan, Kinross, and Fifeshire; length about 25 miles, average breadth about 12; highest summit, Bencleuch, 2363 feet.

Ochre, a combination of peroxide of iron with water; but the name is generally applied to clays coloured with the oxides of iron in various proportions. Considerable quantities of ochre are obtained from the ferruginous mud separated from tin and copper ores; and it is also found in natural beds some feet thick in the more recent formations. Ochres vary in colour from a pale sandy yellow to a brownish red, and are much used in painting.

Och'rida, a town of European Turkey, in the mountainous region of Albania, on the shore of the lake of Ochrida. Pop. 11,000.

Ochro. See *Abelmoschus.*

Ockley, Simon, born at Exeter in 1678, died 1720. He became professor of Arabic at Cambridge in 1711, and published a History of the Jews, several translations from Oriental languages, and a well-known History of the Saracens.

Oclawa'ha ('crooked water'), a river of Florida, U. States, which after a very winding course of 275 miles flows into the St. John's about 25 miles south of Palatka. Its banks are densely wooded, and the country so flat that the waters extend into the forest for a distance on either side. Many tourists visit it, and one of them relates that he steamed on this narrow river for five consecutive hours, and all that time was out of sight of land. He could see only trees and water.

Ocmul'gee River, a river of the U. States, rises in the central part of Georgia, runs in a S.S.E. direction, passing the town of Macon, and ultimately unites with the Oconee to form the Altamaha river. Length about 200 miles.

Oco'nee, a river in Georgia, United States, which rises in Hall co., and unites with the Ocmulgee to form the Altamaha at Colquitt. It is navigable about 100 miles.

O'Connell, Daniel, Irish agitator, born in Kerry in 1775, and educated at a school in Cork and the Catholic colleges of St. Omer and Douay. He studied for the Irish bar, and soon became distinguished for legal skill and oratory. Turning his energy to Irish politics he advocated Catholic Emancipation; skilfully kept the agitation within constitutional lines; became member for Clare in 1828; and attained his triumph in the following year when the government of the Duke of Wellington granted the Catholic claims. After the Reform Bill he became conspicuous as the head of a parliamentary body called 'O'Connell's Tail.' In 1841 he developed his policy, called together enormous meetings throughout Ireland, and loudly raised a cry for the Repeal of the Union. This agitation Sir R. Peel and the government determined to put down. They arrested O'Connell, obtained a conviction, and sentenced him to twelve months' imprisonment with a fine of £2000. In a few months the House of Lords quashed this judgment. He made his last speech in parliament April, 1847, and died the following month.

Oconto, Oconto co., Wis., one of the largest lumber manufacturing points in the State, is on Green Bay, at mouth of Oconto River. Pop. 1890, 5219.

Oc'racoke Inlet, an inlet of North Carolina, forming a passage into Pamlico Sound, 22 miles south-west of Cape Hatteras. On each side of the channel are dangerous shoals; on the bar are 14 feet at low water.

Oc'rea, in ancient costume, a greave or legging, made of tin, bronze, or other metal, covering and protecting the front of the leg from the knee to the ankle.

Oc'tagon, in geometry, is a figure of eight sides and angles, which when the sides and angles are all equal is called a *regular octagon,* and when they are not equal an *irregular octagon.*

Octahe'dron, in geometry, a solid contained by eight equal and equilateral triangles. It is one of the five regular bodies.

Oc'tant, in astronomy, that position or aspect of a heavenly body, as the moon or

a planet, when half-way between conjunction or opposition and quadrature, or distant from another point or body the eighth part of a circle or 45°. The word is also applied to an instrument for measuring angles, resembling a sextant or quadrant in principle, but having an arc the eighth part of a circle, or 45°.

Octave, in music, an interval of seven degrees or twelve semitones above or below some sound counted from; or one sound eight tones higher than another. The octave is the most perfect of the chords, consisting of six full tones and two semitones major. It contains the whole diatonic scale. The most simple perception that we can have of two sounds is that of unisons, or sounds of the same pitch, the vibrations beginning and ending together. The next to this is the octave, where the more acute sound makes precisely two vibrations while the grave or deeper makes one; consequently, the vibrations of the two meet at every single vibration of the more grave one. Hence the ratio of the two sounds that form the octave is as 1 to 2. See *Music.*

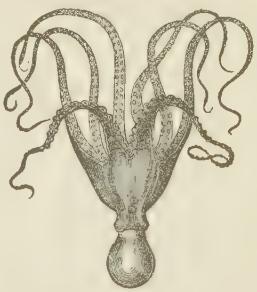
Octa'via, daughter of Caius Octavius and of Atia, and sister to the Emperor Augustus, illustrious for her virtues, her beauty, and her accomplishments, was the widow of Claudius Marcellus, by whom she had a son and two daughters, when she was married, at the instance of her brother, to the triumvir Mark Antony. The latter neglected her for Cleopatra, queen of Egypt; notwithstanding which, Octavia displayed the most noble fidelity to his house and fortunes, and devoted herself to the education of all his children, until he divorced and ordered her to leave his house, a command she obeyed without complaint. She died in 11 B.C.

Octavius, or OCTAVIANUS. See *Augustus.*

Octa'vo, the size of one leaf of a sheet of paper folded so as to make eight leaves: usually written *8vo;* hence, a book having eight leaves to the sheet. There are different sizes of octavo, arising from the different sizes of paper employed; as, *foolscap 8vo, demy 8vo, imperial 8vo.*

October (from the Latin *octo,* eight), originally the eighth month in the Roman calendar, whence its name, which it still retained after the beginning of the year had been changed from March to January.

Oc'topus, a genus of dibranchiate Cephalopoda, familiarly known as cuttle-fishes. They have eight arms, each with two rows of suckers, which are sessile or unstalked. The prominent head is joined to the body by a distinct neck, and the body itself is short, generally more or less rounded in shape, and unprovided with side or lateral



The Common Octopus or Cuttle (*O. vulgāris*).

fins. They have attained a notoriety from tales circulated concerning their ferocity and the existence of gigantic members of the genus, though the largest cuttle-fishes that have been met with have belonged to other genera. The *O. vulgāris,* or common cuttle, is found on the British shores, but is more common in the Mediterranean. It is said to reach a length of 9 feet and a weight of 68 pounds, the arms being long and slender.

Octroi (ok-trwà), an old French term signifying a grant, privilege, or monopoly from government to a person or to a company. Octroi also signifies a tax levied at the gates of French cities, towns, &c., on produce brought in for use.

Ocu'ba-wax, a vegetable wax obtained from the fruit of *Myristica ocūba, officinālis,* or *sebifĕra,* a plant of the nutmeg genus growing abundantly in the marshy grounds on the shores of the Amazon and its tributaries. It is easily bleached, and is used extensively in Brazil for the manufacture of candles.

Oczacow (och-à-kof'), or OTCHAKOF, a town in the Russian government of Kherson, on the Black Sea, at the mouth of the Dnieper, formerly an important Turkish fortress. Pop. 5200.

Od, or ODIC FORCE, the name invented by Reichenbach and given by him to a peculiar force which he fancied he had discovered associated with magnetism. It has met with few scientific believers. Called also *Odyl, Odylic Force.*

Odalisk, ODALISQUE (from Turk. *odalik,* a chamber companion), a female slave or

concubine in the sultan's seraglio or a Turkish harem.

Odal Right, a free tenure of property, similar to allodial tenure, which prevailed in Northern Europe before the introduction of the feudal system. Odal or udal tenure still prevails in Orkney and Shetland.

Oddfellows, a large and extensively ramified friendly society, having its headquarters in Manchester. It was originally an association of a convivial kind, modelled on freemasonry, and still retains watchwords and secret signs. It assumed its present form at a convention in Manchester (1813), and has spread widely in Britain and elsewhere. The unparalleled prosperity of the order of Odd Fellows in the U. States has excited the wonder of the leading men in all fraternal organizations. The first lodge was organized in Baltimore, Md., April 26, 1819; in 1825 the Grand Lodge of the U. States was formed. In 1839 there were 15 grand lodges, 135 subordinate lodges, 11,000 members; in 1893 over 800,000 members, and 8000 lodges. The American system has become popular in France, Germany, Switzerland, Holland, Sweden, Denmark; also in Canada, Mexico, West Indies, South America, Australia and Japan. The amount paid for relief of members, burial of the dead, &c., from 1830, aggregates $60,000,000. See *Friendly Societies*.

Ode, a poem of lyrical character, supposed to express the poet's feelings in the pressure of high excitement, and taking an irregular form from the emotional fervency which seeks spontaneous rhythm for its varied utterance. The Greeks called every lyrical poem adapted to singing—and hence opposed to the elegiac poem—an ode (*ōdē*, that is, *song*). The principal ancient writers who employed this form of verse were Pindar, Anacreon, Sappho, Alcæus, among the Greeks, and Horace among the Romans. As employed by English writers the ode takes either the Pindaric form of strophe, antistrophe, and epode irregularly arranged and contrasted; or, as in its later development, the form of a regular series of regular stanzas.

Odenkirchen (ō'den-kir-*hen*), a town of Prussia, province of Rheinland, 15 miles W. S. W. of Düsseldorf. Pop. 10,161.

Odense (ō'den-sā), a seaport town of Denmark, capital of the Island of Funen, on a stream, and near the fiord of same name. It is well built; has an ancient and magnificent cathedral. Pop. 20,804.

Odenwald (ō'den-vâlt), a forest and chain of mountains in Western Germany, between the Neckar and the Main, in the territories of Hesse, Baden, and Bavaria. The Odenwald is about 50 miles in length, and presents charming scenery.

Ode'on (Gr. *ōdeion*, from *ōdē*, a song), a kind of theatre in ancient Greece in which poets and musicians submitted their works to the approval of the public, and contended for prizes. The name is now sometimes applied to a hall or chamber for musical or dramatic performances.

Oder, a river of Germany, which rises in the Moravian table-land, 14 miles east of Olmütz; flows for about 50 miles through Moravia; forms the frontier between Prussian and Austrian Silesia; becomes navigable at Ratibor; traverses the provinces of Silesia, Brandenburg, and Pomerania; widens into a maritime lake called the Stettin Haff; and enters the Baltic by the three channels of the Peene, the Swine, and the Dievenow; length about 550 miles. The traffic on this river is important, and the principal towns on its banks are Breslau, Glogau, Frankfort, Küstrin, and Stettin.

Odes'sa, a Russian seaport in the government of Kherson, situated on the Black Sea, between the mouth of the Dnieper and Dniester, on the bay of Odessa. After the cession of Bessarabia by the Peace of Jassy in 1792, Catharine II. fixed on this spot, then containing only a few houses, as a commercial emporium. The roadstead is large and deep, but dangerously exposed to easterly winds. The shipping, however, is protected in three large harbours inclosed by moles, and the city is fortified in the modern style. Odessa is situated on the edge of a sterile plateau which here sinks abruptly to the sea. The streets are straight, wide, and cross each other at right angles; there are some fine promenades, two public gardens, and numerous public buildings. The educational institutions include a university founded in 1865. Odessa is one of the chief wheat ports in the East, while wool, timber, hemp, flax, iron, coal, &c., are among the staple exports. Besides the maritime trade, Odessa carries on a large overland trade by rail with Germany, Austria, France, Switzerland, and Italy. Odessa was partially bombarded in 1854 during the Crimean war. Pop. 1890, 313,687.

Odin, or **Woden**, the chief god of Scandinavian mythology, the omniscient ruler of heaven and earth, having his seat in Valas-

kjalf, where he receives through his two ravens tidings of all that takes place in the world. As war-god he holds his court in Valhalla, where all brave warriors arrive after death and enjoy the tumultuous pleasures they delighted in while on earth. His wife is Frigga. The fourth day of the week, Wednesday, derived its name from this deity. See *Northern Mythology*.

Odoa'cer, the first barbarian king or ruler of Italy after the fall of the Western Empire, A.D. 476 to 493. He was of German origin, the son of Edico or Idico, hereditary head of the Scyrri tribe, and received his early training in the camp of Attila, king of the Huns. He afterwards journeyed into Italy, and joined the imperial guard of the Roman army. He was chosen head of the barbarian confederates, and having overthrown Romulus Augustulus, the last of the Roman emperors, he assumed the title of king in 476. Out of policy he paid court to the Byzantine emperor Zeno, from whom he received the title of *Patricius* or Patrician. He ruled with vigour and wisdom. In 489 Italy was invaded by the Ostrogoths under Theodoric, and in repeated battles Odoacer was defeated, being latterly besieged in Ravenna, on the fall of which he was assassinated.

Odom'eter. Same as *Hodometer* (which see).

O'Donnell, Leopold, Duke of Tetuan, Marshal of Spain, born 1809, died in 1867. He was descended from an Irish family long settled in Spain; entered the army and became a colonel; fought against the Carlists in 1833; drove Espartero from power in 1843; was minister of war in 1854, and prime-minister in 1856 and 1858. He commanded with success in the campaign against the Moors 1859-60, being then created Duke of Tetuan. He was at the head of ministries in 1863 and 1865-66.

O'Donovan, John, LL.D., Irish Celtic scholar, born 1809, died 1861; published (with Prof. O'Curry) the Brehon Laws, Annals of the Four Masters, &c.—His son Edmond O'Donovan (born 1838), war-correspondent and traveller, published the Merv Oasis, and was killed in the Soudan 1883.

Odontoglos'sum, an extensive genus of orchids, natives of Central America, much prized by cultivators for their magnificent flowers, which are remarkable both for their size and the beauty of their colours. A considerable number of species have been introduced into Europe, and grow well in a moderate temperature. *O. crispum* or *O. Alexandræ* is a superb flower, and is named after the Princess of Wales.

Odontoglossum Alexandræ.

Odon'tophore, the so-called 'tongue' or masticatory apparatus found in the mouth of the three classes of higher molluscs—the Gasteropods, Pteropods, and Cephalopods—which are thus collectively known as the Odontophora. This structure consists of a gristly portion, which supports a ribbon or strap-like band provided with flinty or siliceous teeth variously disposed in a transverse manner.

Odontorni'thes, a name for certain fossil birds characterized by having teeth, as the hesperornis and ichthyornis (see those articles).

Odysseus (o-dis'ūs). See *Ulysses*.

Od'yssey, an epic poem attributed to Homer, in which the adventures of Odysseus (Ulysses) are celebrated. See *Homer*.

Œcolampa'dius, Johann, an early Protestant writer, born of a Swiss family at Weinsberg, in Suabia, in 1482, died 1531. His proper name was Heussgen or Hussgen, which, according to the custom of the time, he converted into Œcolampadius. He studied law at Heidelberg and Bologna; became tutor to the sons of the elector-palatine; afterwards prepared himself for the ministry and accepted a call as preacher to Basel. When Luther spread his reformed doctrine it was accepted by this Swiss preacher, who fearlessly proclaimed his new faith (1522) from his pulpit at Basel. Subsequently, however, he took the view of Zwingle regarding the Lord's supper, and on this point

disputed with Luther and Calvin. Among the works which he wrote in furtherance of the Reformation are De Ritu Paschali, and Epistola Canonicorum Indoctorum ad Eccium.

Œcumen'ical (Greek, *oikoumenikos*, pertaining to the whole inhabited world), universal, an epithet applied to the general councils of the church. From the time of the Council of Chalcedon (451) the patriarchs of Constantinople took the title of œcumenical, in the same sense as the epithet Catholic is used in the Western Church. See *Council*.

Oede'ma, a swelling occasioned by the presence of water which collects in the interstices of the cellular tissues. The subcutaneous cellular tissue is the most frequent, but not the only seat of oedema. The other forms which are most frequently recognized during the life of the patient are oedema of the lungs and of the glottis. Oedema of the brain is of less frequent occurrence and less easily recognized, and oedema of the sub-mucous and sub-cellular tissue seldom produces symptoms sufficiently decisive to determine their nature. When the disease is associated with erysipelas, deep-seated suppuration, or a morbid state of the circulation, it is attended with great danger.

Oedenburg (*eu'*dén-bu*r*h), a town of Western Hungary, capital of the county of the same name, on a plain near Lake Neusiedl, 36 miles S.S.E. of Vienna. It is well built, and has manufactures of woollen, linen, cotton cloth, sugar-refining, &c. Pop. 21,169.

Œ'dipus, in ancient Greek legend, son of King Laius of Thebes, was exposed as an infant—on account of an oracle saying that Laius would be killed by his son—and was brought up at the court of Corinth. Having solved the riddle of the Sphinx he became king of Thebes, unknowingly killed his own father and married his mother Jocasta—a fate foretold by the Delphic oracle. On realizing what had been done Jocasta hanged herself, and Œdipus put out his own eyes. This story has been used by the poets to symbolize the helplessness of man before Fate. The Œdipus of Æschylus and Euripides are lost, but the King Œdipus and Œdipus at Colonos of Sophocles remain. The story has also been made the subject of tragedies by Corneille, Voltaire, Chénier, Dryden, and Lee.

Oehlenschläger (*eu'*lén-shlā-gėr), Adam Gottlob, born in a suburb of Copenhagen 1779, died 1850. His education was desultory: he tried the stage under the training of Rosing; entered the University of Copenhagen in 1800, and published his first volume of poems in 1803; was soon recognized as the chief Danish poet; received a government grant which enabled him to visit Germany, France, Switzerland, and Italy (where he met Goethe, Fichte, Madame de Stäel), and thereby deepened his interest in the new Romantic movement spreading through Europe. His finest works, such as Baldur hin Gode, Palnatoke, Axel og Valborg, and the tragedy of Hakon Jarl, were written at this period. Returning to Denmark in 1810, after an absence of five years, he was appointed professor of æsthetics in the University of Copenhagen. In the controversy which his writings occasioned Oehlenschläger took no personal part, but continued to write almost to the end, his chief works, besides those above-mentioned, being: Helge, Hroars Saga, Nordens Guder, Erik og Abel, Dronning Margrethe, and Dina.

Oeil-de-bœuf (eu-yė-d-beuf; Fr., 'ox-eye'), applied in architecture to the round or oval openings in the frieze or roof of a large building to admit light.

Oeland (*eu'*lànt), a Swedish island in the Baltic, on the east coast of Sweden opposite Kalmar, and separated from the mainland by a sound which has an average breadth of 10 miles. In length it is 85 miles, its breadth averages about 4 miles, and the population is about 40,000.

Oels (eulz), a town of Prussia, in the province of Silesia, 17 miles north-east of Breslau, on the Oelsa. It has manufactures of agricultural implements, and several oil and other mills. Pop. 10,276.

Oelsnitz (eulz'nits), a town of Germany, in Saxony, on the White Elster, with manufactures of cottons, &c. Pop. 6832.

Oerebro. See *Örebro*.

Oersted. See *Örsted, Hans Christian*.

Oesel (*eu'*zl), an island of Russia, government of Livonia, in the mouth of the Gulf of Riga; length about 80, greatest breadth about 40 miles. Its coast is generally bold and its interior undulating, and the climate is much milder than on the adjoining mainland. It raises corn, hemp, flax, and the fisheries are valuable. Pop. 46,000.

Œsoph'agus, or Gullet, the membranous and muscular tube which leads from the pharynx or back part of the mouth to the stomach. In man the length of the gullet is from 9 to 10 inches. It begins at the fifth cervical or neck vertebra, at a point

corresponding with the cricoid cartilage of the larynx, and it runs in a slightly deviating course downwards to the stomach. Thus in the neck it lies close behind the windpipe; whilst in the chest it bends to the right side and then to the left before it pierces the midriff or diaphragm—which forms the floor of the chest—by a special aperture existing in that structure. Internally the gullet is lined by mucous membrane, and between the mucous and muscular layers cellular tissue exists. The mucous or lining membrane is thick and of pale colour, and is arranged in longitudinal furrows or folds. In the lower animals the modifications of the œsophagus are various. In birds, for instance, it presents the expansion known as the *crop*.

Œstrus. See *Gadfly*.

Œta, a mountain in ancient Greece, forming the south boundary of Thessaly, and separating that country from Central Greece. At the east extremity was the Pass of Thermopylæ. See *Thermopylæ*.

Ofen. See *Budapest*.

Offa, a distinguished king of Mercia, who attained the throne after Ethelbald, on defeating the usurper Beornred, A.D. 757. He brought Kent under his sway, and reduced the power of Wessex by a defeat inflicted in 777. He also defeated the Welsh, took from them part of their border lands, and to keep them within their new limits erected here the rampart known as Offa's Dyke (which see). Latterly he murdered Ethelbert, king of East Anglia, and seized his kingdom. He founded the Abbey of St. Albans, and was a liberal patron to the church. He died in 796.

Offa's Dyke, a rampart, the remains of which may still be seen extending along the English and Welsh border from the vicinity of Newmarket, in Flintshire, to Beachley, at the mouth of the Wye; length about 100 miles. Its erection is ascribed to King Offa of Mercia. See above.

Offenbach (of'en-bȧh), a town of Germany, Grand-duchy of Hesse, 5 miles E.S.E. of Frankfort (with which it is connected by an electric railway), on the left bank of the Main. It is well built, has an old castle, and is an important commercial and manufacturing centre, its industries embracing various chemical products, as aniline, white-lead, vaseline, celluloid, &c.; metal goods, leather and leather goods, paper, &c. Pop. 31,704.

Offenbach, Jacques, French composer, born of Jewish parents at Cologne in 1819, died 1880. He entered the Paris Conservatoire in 1835; became proficient on the violoncello, and for some time played on this instrument in the orchestra of the Théâtre Comique. In 1847 he became conductor at the Théâtre Français, and subsequently opened the 'Bouffes Parisiens,' where he enjoyed immense popularity as the composer of such operas as Orphée aux Enfers, La Grande Duchesse, La Belle Hélène, Madame Favart, La Barbe Bleue, Geneviève de Brabant, and La Princesse de Trebizonde.

Offenburg, a town of Baden, on a hill near the right bank of the Kinzig, 42 miles south of Carlsruhe. It is well built, has a fine town-house, merchant-hall, gymnasium, and thriving manufactures. Pop. 7759.

Offerings. See *Sacrifices*.

Offertory, that portion of the service of the Eucharist in which the offerings of the congregation are made, whether these consist of bread and wine or alms. The term is used in the Roman Catholic Church to denote that portion of the mass which is being sung when the priest offers the bread and wine; while in the Church of England it is applied to the sentences read from the service when the alms are being collected, or is applied to the alms themselves.

Office, Divine, in the Roman Catholic Church, the entire complement of services which constitute the established order of celebration of public worship. See *Breviary*, *Missal*, and *Liturgy*.

Officers, Military and Naval. In the army, *general officers* are those whose command extends to a body of forces composed of several regiments, as the general, lieutenant-general, major-generals, and brigadiers. *Staff-officers*, those who belong to the general staff, as the quartermaster-general, adjutant-generals, aides-de-camp, &c. *Commissioned officers*, those appointed by a commission from the crown or from a lord-lieutenant, the lowest grade in the British army being now that of lieutenant. *Brevet officers*, those who hold a rank above that for which they receive pay. *Non-commissioned officers*, those who are appointed by the commanding officers of the regiments, and who form a step intermediate between commissioned officers and private soldiers, as sergeant-majors, quartermaster-sergeants, corporals, and drum and fife majors. In the navy, officers are distinguished into *commissioned officers*, who hold their commissions from the lords of the admiralty; *warrant*

officers, officers holding a warrant from the admiralty, as boatswains, carpenters, gunners, and one class of engineers; *petty officers*, who are appointed by the captains. In the United States army the officers are—general, lieutenant-general, major-general, brigadier-general, colonel, lieutenant-colonel, major, captain, first and second lieutenants. In the navy, vice-admiral, rear-admiral, commodore, captain, commander, lieutenant-commander, lieutenant, and ensign.

Offici'nal (Latin, *officīna*, a workshop), in pharmacy, the name applied to the recipes admitted into the pharmacopœia, and in particular to plants used in the preparation of recognized medical recipes.

Offing, a nautical term signifying the position of a vessel, or of a portion of the sea within sight of land, relatively to the coast. The offing may be taken to represent that part of the sea beyond the midline between the coast and the horizon.

Og, king of Bashan at the time of the conquest of Canaan by the Israelites, by whom he and his people were destroyed.

Ogden, Weber co., Utah, 37 m. N. of Salt Lake City, at the junction of the Central Pacific, Union Pacific, and Utah Central R. Rs., has large agricultural and mining interests. Pop. 1890, 14,889.

Ogdensburg, a town and river port of the United States, in New York state, on the right bank of the St. Lawrence, at the mouth of the Oswegatchie, 72 miles below Lake Ontario. It is regularly laid out, well built, and a place of very extensive trade. Pop. 1890, 11,662.

Ogee (ō-jē'), in architecture, a moulding consisting of two members, the one concave, the other convex, or of a round and a hollow; otherwise called a *cyma reversa*. (See *Cyma*.) An *ogee arch* is an arch with a similar curve. Ogee is frequently expressed by the two capitals OG.

Og'ham, a particular kind of writing practised by the ancient Irish and some other Celtic nations. Its characters (also called *oghams*) consist principally of lines or groups of lines deriving their significance from their position on a horizontal or chief line, under, over, or through which they are drawn either perpendicular or oblique; curves rarely occur. Authorities differ as to the total number of letters represented in the alphabet, some making sixteen, others twenty-five. Regarding the age of this form of writing it is now supposed that it was used not only in prehistoric times, but also so late as the 9th and 10th centuries. Stones with ogham inscriptions are found in Leinster and Con-

Ogham Inscription, from a stone found near Ennis.

naught, also in some parts of Wales. Spelled also *Ogam*.

Oglio (ol'yō), a river of N. Italy, which rises in the Alps, drains Lake Iseo, and falls into the Po; length, 150 miles.

O'goway, Ogowai, or Ogowé, a river of Africa which enters the Atlantic at Cape Lopez through a large delta on the west coast, about 400 miles north of the Congo. Its course is chiefly in the French Congo Territory, and its chief affluents are the Ivindo and the Ngunie. A number of French stations have been established on its banks.

Ogyges (o-gī'jēz), in Greek mythology, the most ancient ruler of Attica, in whose reign happened a great deluge.

Ohi'o, a river in the United States of America, formed by the confluence of the Alleghany from the north and the Monongahela from the south, at Pittsburg in Pennsylvania, where it is a navigable stream 600 yards broad. It flows W.S.W., separating the states of Virginia and Kentucky on the south from Ohio, Indiana, and Illinois on the north, and enters the Mississippi at Cairo. Its length from Pittsburg to its junction with the Mississippi is 975 miles; area of basin, 214,000 square miles. The width of the river varies from 400 to 1400 yards; average width, about 800 yards, at its mouth 900 yards. Its principal affluents are the Miami, Kentucky, Wabash, Green, Cumberland, and Tennessee.

Ohio, a state in the American Union which ranks fourth in point of population and agricultural products, is bounded on the north by Lake Erie and the state of Michigan, west by Indiana, south by West Virginia and Kentucky, east by West Virginia and Pennsylvania; area, 41,060 sq. miles. In the north the surface is generally level, and in some places marshy; in the east and south-east it is rugged and broken by hills, but never rises into mountains. In its natural state Ohio was covered

with dense forests; now they cover but about one-fifth, the trees most abundant being several varieties of oak, maple, ash, black and white walnut, chestnut, beech, poplar, sycamore, linden, &c. The drainage is divided between the Ohio and Lake Erie. The former, which receives the far larger share, bounds the state partly on the east and wholly on the south, and is augmented from within it by the Mahoning, Beaver, Muskingum, Hockhocking, Scioto, and the Great and Little Miami; the former, which washes the northern frontier for 160 miles, receives the Maumee, Portage, Sandusky, Huron, Cuyahoga, Grand, and Ashtabula. The climate in the northern parts is characterized by severe winters; the summers and autumns are mild and agreeable. In the south the winters are very mild, the summers long and often intensely hot. The chief crops are Indian corn (the staple), wheat, oats, rye, buckwheat, barley, and tobacco, while the orchard products are important. Horses, sheep, cattle, and swine are reared in great numbers. Coal and iron are abundant, particularly in the north-east, while salt, marble, limestone, free-stone, and gypsum are found in many districts. The more important manufactures are bar, sheet, and railway iron, machinery, hardware, and various articles in metal; leather, woollen cloth, paper, and spirits. Cotton, silk, flax, and mixed goods are also made to some extent. The foreign trade, carried on chiefly with Canada across Lake Erie, is comparatively small; but a very extensive inland trade is carried on both by the Ohio and by numerous canals and railways, which traverse the country in every direction. Among the higher educational establishments are the university at Athens; several denominational universities and colleges; schools of law, medicine, and theology. Ohio sends two senators and twenty-one representatives to Congress, and has twenty-three votes in the presidential election. Columbus is the capital, but the two largest towns are Cincinnati and Cleveland, others being Toledo, Dayton, and Springfield. Pop. 1890, 3,672,316.

Ohlau (ō'lou), a town in Prussia, in the province of Silesia, 18 miles south-east of Breslau, on the Ohlau, and on the railway to Cracow. Pop. 8575.

Öhlenschläger. See *Œhlenschläger.*

Ohm (ōm), Georg Simon, German physicist, born 1787, died 1853. He became successively professor of physics at Cologne, director of the Polytechnic at Nuremberg, and professor of physics at the University of Munich. He was the discoverer of what is known as 'Ohm's Law' in electricity (which see); and among his scientific works were Die Galvanische Kette, Grundzüge der Physik, &c.

Ohm, the unit of resistance to the passage of electricity adopted by the British Association. A piece of pure copper wire 485 metres long and 1 millimetre in diameter at 0° C. has a resistance of about one ohm. A 'megohm' is a resistance equal to 1,000,000 ohms, and a microhm is a resistance equal to one-millionth of an ohm.

Ohm's Law, an important law in electricity, deduced by Professor Ohm, to the effect that *the intensity of the electric current is directly proportional to the whole electromotive force in operation, and inversely proportional to the sum of the resistances in the circuit.*

Oïd'ium, a genus of microscopic fungi. *O. Tuckeri* is the vine mildew, parasitical, in the form of a white and very delicate layer, upon the leaves and green parts of vines, and destroying the functions of the skin of the part it attacks.

Oïdium.

Oil-beetle, the name given to coleopterous insects of the genus *Meloë*, and the family Cantharidæ, from the oily-like matter which they exude. The perfect insects have swollen bodies, with shortish elytra, which lap more or less over each other, and have not a straight suture, as in most coleopterous insects.

Oil-bird. See *Guacharo.*

Oil-cake, a cake or mass of compressed linseed or rape, poppy, mustard, cotton, and other seeds from which oil has been extracted. Linseed-cake is much used as a food for cattle, its value as a fattening substance being greater than that of any kind of grain or pulse. Rape-cake is used as a fattening food for sheep. These and other oil-cakes are also valuable as manures.

Oil City, a city of the U. States, in Pennsylvania, on the Alleghany, an important petroleum centre. Pop. 1890, 10,932.

Oil-gas, the inflammable gas and vapour (chiefly hydrocarbon) obtained by passing fixed oils through red-hot tubes, and which may be used like coal-gas for purposes of

illumination. The oil in its passage through the retorts is principally decomposed, with the production of ethylene, marsh-gas, hydrogen, carbonic oxide, benzene, &c.

Oil Locomotive, locomotive engine fired by oil as a fuel. These have been successful on the Gt. Eastn. Rwy., England; 130 miles was made in 160 mins. in Feb., 1898.

Oil of Vitriol, the common name of strong sulphuric acid (which see).

Oil-painting. See *Painting.*

Oil-palm (*Elæis guineensis*), an African tree abounding on the west coast of that continent, whose fruit yields palm-oil. See *Palm-oil.*

Oils, a term given to substances formed within living animal or vegetable organisms, liquid at ordinary temperatures, having a more or less viscid consistence, insoluble in and lighter than water, taking fire when heated in air, and burning with a more or less luminous flame. The oils are usually divided into the *fat* or *fixed oils,* and the *volatile* or *essential oils.* Another division would be into *vegetable oils,* by far the most numerous, and *animal oils;* and as a third popular division, the *mineral oils* (petroleum, naphtha). The fat or fixed oils are subdivided into the *drying* and the *non-drying oils.* The former class includes all oils which thicken when exposed to the air, through the absorption of oxygen, and are converted thereby into varnish, as, for example, linseed, nut, poppy, and hemp-seed oil. All the drying oils are of vegetable origin. The *non-drying* oils (which are partly of vegetable, partly of animal origin) when exposed to the air also undergo a change resulting in the formation of acrid, disagreeably-smelling, acid substances, but though they thicken they do not become dry. The fixed vegetable oils (whether drying or non-drying) are generally prepared by subjecting the seeds of the plant to pressure, with or without heat, and they may also be extracted by means of certain solvents. The animal oils are, for the most part, the fluid parts of the fat of the animal, and are separated by heat alone. Vegetable fixed oils all consist of one or more proximate principles. Thus olive-oil contains chiefly olein, with a little stearin; linseed-oil is composed mainly of linolein. The most important of the drying oils are linseed, hemp, walnut, poppy, candle-nut, sesame, sunflower, madia, safflower. Of the non-drying oils the chief are olive, cotton-seed, colza, rape, ground-nut, castor, croton, &c. A certain number of the vegetable oils are also known as vegetable fats, from their consistency at ordinary temperatures, such as palm-oil, cocoa-nut oil, shea-butter. The animal oils comprise neat's-foot oil, train-oil, seal-oil, sperm-oil, porpoise-oil, cod-liver oil, shark-oil, &c. The uses of the fixed oils are very various. Many are used as articles of food, others are used in medicine, numbers as lubricants, some in the composition of paints and varnishes; some are important sources of artificial light, and generally when acted on by an alkali they form soaps. A use of oil now coming into some importance is as an agent for calming the waves of the sea in certain circumstances, more especially to prevent them from breaking over a boat and so swamping her. That oil has this effect has been clearly demonstrated and has been actually tested in violent storms in mid-ocean.

Volatile oils are generally obtained by distilling the vegetables which afford them with water; they are acrid, caustic, aromatic, and limpid; they are mostly soluble in alcohol, forming essences. They boil at a temperature considerably above that of boiling water, some of them undergoing partial decomposition. A few of them are hydro-carbons; the greater number, however, contain oxygen as one of their ultimate elements. They are chiefly used in medicine and perfumery; and a few of them are extensively employed in the arts as vehicles for colours, and in the manufacture of varnishes, especially oil of turpentine. They are very numerous, among them being the oils of anise, bergamot, clove, cinnamon, cajeput, lavender, lemon, lime, orange, mint, peppermint, nutmeg, marjoram, rosemary, thyme, &c.

Oil-tree, a name for several trees, especially the *Ricĭnus commūnis,* from the seeds of which castor-oil is expressed; and an Indian tree, *Bassia longifolia,* from the seeds of which a thick oil is expressed, which the Hindus use for their lamps, for soap, and for cooking.

Oise (wäz), a river in France, which rises in the province of Hainaut in Belgium, among the Ardennes, flows south-west across the department of Aisne-et-Oise, and joins the Seine on its right bank about 6 miles below Pontoise; total course, about 180 miles, of which 100, beginning below Chauny, are navigable.

Oise, a northern department in France, bounded by the departments of Somme,

Seine-Inférieure, Eure, Seine-et-Oise, Seine-et-Marne, and Aisne; area, 2261 sq. miles. A considerable part of the soil is a strong clay, well adapted for wheat; but barley, oats, and rye are considered the most profitable crops, and a great number of cattle are reared. Pop. 1891, 401,835.

Oka, the name of two rivers, the one in European and the other in Asiatic Russia. The former, rising in the government of Orel, flows north till near the town of Kaluga, then east past that town, then E.N.E. across Riazan and the east of Vladimir, and after a course of 800 miles, navigable from Orel, joins the Volga at Nijni-Novgorod. The latter, rising in the mountains between China and the government of Irkutsk, flows N.N.E. for 400 miles, and joins the left bank of the Angara at Bratsk.

Okeecho'bee Lake ('Big Water'), a large shallow lake in Southern Florida; about 40 miles in length by 25 in breadth, and with a maximum depth of 12 feet. Its waters are discharged through the Everglades, but there is no appreciable outlet stream. It contains a few low islands, and a drainage company has been reclaiming land since 1881.

Oken, Lorenz, German naturalist, born in 1779; studied at Würzburg and Göttingen; died 1851.

Okhotsk (*o-hotsk'*) Sea of, an inlet of the North Pacific Ocean, bounded on the north by Russian Siberia, east by Kamtchatka, partly inclosed by the Kurile Islands on the south and the island of Saghalien on the west. On the northern shore is the small seaport of the same name.

Oklaho'ma. This new territory in the United States was organized by Act of Congress, May 2, 1890, out of a portion of the Indian Territory and the "Public Land Strip," an unorganized area of United States lands; bounded east by the 100th meridian, south by Texas, west by New Mexico, and north by Colorado and Kansas. The Territory contains 39,030 square miles. There are seven counties. The rich and fertile lands caused a great rush of settlers, as soon as they were opened to immigration. The capital is Guthrie. The Territorial Legislature has a Council of thirteen members, and a House of Representatives of twenty-six members. Pop. in 1890, 61,834.

Okro. See *Abelmoschus.*

Olaf, or St. Olaf, one of the most celebrated of the Norwegian kings, great-great-grandson of Harald Haarfager, and son of Harald, chief of the district of Gränland, was born about 995. He was a friend of the Normans, and fought as an ally of Ethelred's in England. He afterwards established himself on the throne of Norway, and was a zealous supporter of Christianity. Canute the Great having landed in Norway with an army, Olaf fled to Russia, and in attempting to recover his dominions he was defeated and slain at the battle of Stiklestad (1030). Since 1164 he has been honoured as the patron saint of Norway. The order of St. Olaf, a Norwegian order given in reward for services rendered to king and country or to art and science, was founded in 1847.

Öland. See *Oeland.*

Olbers, Heinrich Wilhelm Matthæus, a German astronomer, born in 1758, died 1840. He studied medicine in Göttingen, and practised in Bremen. Astronomy, however, became the ruling passion of his life. He directed his attention particularly to comets, and besides furnishing the most complete lists of the comets whose course had been calculated, in 1815 he discovered a new one, which bears his name. Another discovery for which he is still better known is that of two minor planets, Pallas in 1802, and Vesta in 1807.

Oldbury, a town of England, in the county of Worcester, in the heart of a mining district, 5 miles W.N.W. of Birmingham. It has manufactures of chemicals, iron and steel works, edge-tool and nail works, brick and tile works, limestone quarries, and extensive iron and coal mines. Pop. 20,348.

Oldcastle, Sir John, Lord Cobham, was born in the 14th century, in the reign of Edward III., and obtained his peerage by marrying the daughter of Lord Cobham. He excited the resentment of the clergy by his zealous adherence to the doctrines of Wickliffe, whose works he collected, transcribed, and distributed among the people. Under Henry V. he was accused of heresy; but the king, with whom he was a favourite, delayed the prosecutions against him, and tried to convince him of his alleged errors, but in vain. He was then cited before the Archbishop of Canterbury (1413), condemned as a heretic, and committed to the Tower, whence he escaped into Wales. Four years afterwards he was retaken and burned alive in St. Giles' Fields (Dec. 1417). He wrote Twelve Conclusions, addressed to the parliament of England.

Old Catholics, the name first assumed by a party in the Church of Rome who, led by Dr. Döllinger, professor of ecclesiastical history at Munich, refused to accept the decree of the Vatican Council of 1870, teaching and defining the universal jurisdiction and personal infallibility of the pope. Though united in protesting against the new dogma, they claim to be faithful to the ancient traditional constitution of the church; have never seceded from it, and still hold they have a joint interest in its possessions. The chief centres of the Old Catholic movement are the universities of Germany; but the movement was also set agoing in Switzerland, where it has spread rapidly and widely. At the first Old Catholic congress, held at Munich, September, 1871, it was determined to form separate congregations for the body, and to enter into a close connection with the Church of Utrecht (the so-called Dutch Jansenists. See *Jansenists*). After this the Old Catholic movement spread more rapidly. At their second congress, held at Gürzenich, 1872, the Old Catholics resolved to elect Dr. Joseph Reinkens as their first bishop. At the third congress, held in 1873 at Constance, a synodal constitution was adopted. Yearly congresses have since been held, and in 1878 it was resolved that celibacy was not incumbent on priests. The Old Catholic movement in Germany was greatly aided from the first by the position taken up by the imperial government, and still more by the governments of some of the separate states. The imperial government declared the right of Old Catholics to retain what offices they held, and the emoluments of these offices, in spite of any sentence of excommunication passed on them by their bishops. The Old Catholic movement has had a similar course in Switzerland. There also the bishops unanimously supported the new dogma, and excommunicated the priests who rejected it; but there also the state intervened, and zealously protected the latter. At present the Old Catholics of Switzerland number about 80,000, and have a bishop residing at Bern. Those of Germany number 70,000 (their bishop residing at Bonn), while the movement has spread to some extent in France and Austria.

Oldenburg, a grand-duchy in the north of Germany, consisting of three separate and distinct territories, viz. the Duchy of Oldenburg, the principality of Lübeck, and the principality of Birkenfeld; total area, 2479 square miles. (1) The first of these divisions, the Duchy of Oldenburg, is bounded on the north by the German Ocean, and on the other three sides by Hanover and Bremen. The country is flat; the soil marshy and sandy, with little cultivation and large tracts of heath and forest; there are no hills or lakes; the principal river is the Weser, and the internal navigation is facilitated by a new canal, which connects the Hunte and the Ems. The chief crops are wheat, oats, rye, hemp, and rape. Stock breeding is extensively carried on, and there are industries connected with cotton, wool, jute, &c. (2) The principality of Lübeck, situated in East Holstein, north of the town of Lübeck, is bounded partly by the Baltic; area, 210 square miles, of which the greater part is cultivated. Chief town Eutin (pop. 4574). (3) The principality of Birkenfeld, situated in Rhenish Prussia, is a hilly country with fertile valleys; area, 194 miles; the chief towns Birkenfeld and Oberstein. The grand-duchy sends three members to the Reichstag or diet of the empire, and one to the Bundesrath or Federal Council. The revenue, 1893, was 5,997,151 marks. The grand-duke has a civil list of £12,750. Oldenburg was raised to the dignity of a grand-duchy by the Congress of Vienna in 1815, and the greater part of the two principalities added to it. Pop. 1890, Oldenburg, 279,008; Lübeck, 34,721; Birkenfeld, 41,242; total, 354,968. The capital is Oldenburg (see next article).

Oldenburg, a town of Germany, capital of the grand-duchy of same name, 24 miles W.N.W. of Bremen, on the Hunte (which is navigable). It has fine promenades on the site of the old fortifications, a grand-ducal palace, public library of 150,000 volumes, picture-gallery, gymnasium; manufactures of glass, leather, earthenware, &c. Pop. 1890, 23,118.

Oldham, a town of England, in Lancashire, 6 miles north-east of Manchester. It is very irregularly built, and cannot boast much of its public buildings, though it has a handsome and commodious town-hall, lyceum and science and art school, free library and museum, &c. The spinning and weaving of cotton are the staple industries of the town, and employ within it and in its vicinity about 250 mills; and there are several large machine-shops, foundries, tanneries, roperies, silk-factories, bleach-works, &c. Oldham, first made a parliamentary borough by the Reform Act of 1832, sends two members to the House of Commons. Pop. parl. bor. 1891, 183,871.

Oldha'mia, a fossil organism found in the Lower Cambrian rocks of Wicklow, from its branching form thought by some to be a plant, but by others ranked among the Polyzoa.

Old Red Sandstone, a geological term made popular by the writings of Hugh Miller, and applied by him to the red sandstone which underlies the Carboniferous System, in contradistinction to the New Red Sandstone, which overlies the latter. It is now generally included in the Devonian System. See *Geology.*

Old Tom, a variety of gin manufactured in England.

Oldtown, Penobscot co., Me.; lumbering is the chief industry. Pop. 1890, 5312.

Oldys, WILLIAM, bibliographer, born according to some in 1687, according to others in 1696; died 1761. He was appointed librarian to the Earl of Oxford, remained ten years in this nobleman's service, and in 1755 was appointed Norroy king-at-arms by the Duke of Norfolk. The works by which he is best known are the British Librarian, a bibliographical treatise, and a Life of Sir Walter Raleigh, prefixed to his History of the World (1738).

Olea'ceæ, a nat. order of monopetalous exogenous plants, allied to and sometimes united with Jasminaceæ, and chiefly inhabiting temperate climates. The species best known are the olive, lilac, and privet.

Olean, Cattaraugus co., N. Y., has a large lumber and produce trade. Pop. 1890, 7358.

Olean'der, a plant of the nat. order Apocynaceæ, genus *Nerium,* the *N. Oleander,* known also by the name of rose-bay, a beautiful evergreen shrub, with flowers in clusters, of a fine rose or white colour but of an indifferent smell. The plant, especially the bark of the root, is medicinal and poisonous.

Oleas'ter, *Elæagnus hortensis* (order Elæagnaceæ), also called wild olive tree, a small tree of the south of Europe and west of Asia, often cultivated in English gardens and shrubberies especially for its blossoms, which are very fragrant. It flowers in May.

Olef'iant Gas, the name originally given to ethylene or heavy carburetted hydrogen. It is a compound of carbon and hydrogen in the proportion expressed by the formula C_2H_4, and is obtained by heating a mixture of two measures of sulphuric acid and one of alcohol. It was discovered in 1796. It is colourless, tasteless, and combustible, and has an aromatic odour not unlike that of oil of caraways.

Ole'ic Acid ($C_{18}H_{34}O_2$), an acid resulting from the action of olive and some other oils upon potash. It enters largely into the composition of soaps, forming with potash soft soap and with soda hard soap.

Olenek', a river of Northern Siberia which rises under the polar circle, and enters the Arctic Ocean to the west of the Lena delta; length, about 1200 miles.

Oleomargarin. See *Margarine.*

Oléron (ō-lā-rōn), an island of Western France, about 1 mile from the coast of the department of Charente-Inférieure, to which it belongs. Greatest length, 18 miles; greatest breadth, 7 miles; area, 96 square miles. With the exception of the west side the surface is generally fertile, producing good corn and wine. It has two towns, Château and St. Pierre, the former fortified. The population is about 18,000.—What are known as the laws of Oléron were a code of maritime laws which long regulated the navigation connected with La Rochelle, Bordeaux, and the coasts of Normandy and Brittany, and were also adopted in other countries, as Spain, the Netherlands, and England. It was compiled about the end of the 11th or the beginning of the 12th century.

Olfac'tory Nerves, the nerves of smell, the first pair of cerebral nerves or nerves from the brain. They arise chiefly in connection with the cerebral hemispheres, and numerous filaments from them, perforating the ethmoid bone, are distributed over the mucous membrane of the nose. See *Nose.*

Olhão (ol-yä'u̯n), a seaport of Portugal, prov. Algarve. Pop. 7514.

Oli'aros. See *Antiparos.*

Olib'anum, a gum resin used as incense, and obtained from the tree *Boswellia serrāta.* It is yellow of colour, bitter in taste, and diffuses an aromatic odour when burned. See *Frankincense.*

Olifant River. See *Elephant River.*

Ol'igarchy (from Gr. *oligos,* few, and *archē,* government), that form of government in which the supreme power is placed in the hands of a small exclusive class.

Ol'igoclase, a soda-lime felspar, the soda predominating; it occurs in granite, porphyry, and other igneous rocks.

Olin'da, a seaport town of Brazil, in the province of Pernambuco, on the Atlantic, 3 miles north of Recife, with which it unites in forming what is commonly called the city of Pernambuco. Pop. 8000.

Ol'iphant, LAURENCE, son of Sir Anthony Oliphant, chief-justice of Ceylon, was born in England 1829, died in 1888. He studied law at the University of Edinburgh, travelled extensively in Southern Russia and the Crimea; became private secretary to Lord Elgin when he was governor-general of Canada, and subsequently accompanied him (1857) on his mission to China and Japan. Returning to Europe he became Paris correspondent to the Times; entered parliament for the Stirling Burghs in 1865, but retired three years later; and, after his attempt to found a Socialistic religious community in Portland, N.Y., had failed, he resided principally in Palestine, near Mount Carmel. Besides frequent contributions to periodical literature he published Journey to Khatmandu, The Russian Shores of the Black Sea, Minnesota and the Far West, The Transcaucasian Campaign of Omer Pasha, A Narrative of the Earl of Elgin's Mission to China and Japan, Patriots and Filibusters, Piccadilly, The Land of Gilead, Traits and Travesties, Altiora Peto (a novel), Masollam (a novel), Sympneumata, and Scientific Religion, the last works exhibiting his peculiar mysticism and tendency to spiritualism.

Oliphant, MRS. MARGARET, maiden name Wilson, novelist, born near Musselburgh, Scotland, in 1808. Her first work of fiction appeared in 1849 under the title of Passages in the Life of Mrs. Margaret Maitland, and since then she has maintained a high place as a novelist by such works as Adam Graeme, The Chronicles of Carlingford (The Rector, The Doctor's Family, Salem Chapel, The Perpetual Curate), The Minister's Wife, Young Musgrave, John, Squire Arden, At his Gates, A Rose in June, The Ladies Lindores, The Beleaguered City, Sir Tom, Lady Car, &c. Besides this fictional work she has written a Life of Edward Irving, a Life of Francis of Assisi, Memoir of Count Montalembert, biographies of Molière, Cervantes, and Sheridan, Historical Sketches of the Reign of George II., The Makers of Florence, The Makers of Venice, a Literary History of England, and a Memoir of Principal Tulloch.

Oli'va, a village in Prussia, in the province of East Prussia, not far from Dantzig. In a Cistercian abbey in this village a peace was concluded, May 3, 1660, which terminated the war between Sweden, Poland, the emperor, and Brandenburg. Pop. 3922.

Oliva'rez, GASPAR DE GUZMAN, COUNT OF, Spanish statesman, born in 1587, died 1645. He was educated at the University of Salamanca, afterwards appointed gentleman of the bed-chamber to the Prince of Asturias, and when his royal master succeeded to the throne as Philip IV. Olivarez was appointed prime-minister. For twenty-two years (1621–43) his power was almost unlimited, but the severity of his administration ultimately caused revolt in Catalonia and Andalusia, while the Portuguese threw off the Spanish yoke. The end of his policy was public discontent and his own private disgrace. He was confined by the king at Toro, where he died.

Olive, a fruit-tree of which there are several species, the most important being the common olive (*Olea europæa*, natural order Oleaceæ). It is a low branching evergreen tree, in height from 20 to 30 feet, with stiff narrow dusky-green or bluish

Olive (*Olea europæa*).

leaves. The flowers are small and white, and are produced in axillary racemes, and appear in June, July, and August. The fruit is a berried drupe of an oblong spheroidal form, with a thin, smooth, and usually blackish skin, containing a greenish soft pulp adherent to a rough, oblong, and very hard stone. It is bitter and nauseous, but replete with a bland oil. The olive is a native of Syria and other Asiatic countries, and flourishes only in warm and comparatively dry parts of the world. It grows slowly, and is very long-lived. The olive-tree has in all ages been held in peculiar

estimation. It was anciently sacred to Minerva. Olive wreaths were used by the Greeks and Romans to crown the brows of victors, and it is still universally regarded as an emblem of peace. The wood of the olive-tree is beautifully veined, and has an agreeable smell. It is in great esteem with cabinet-makers on account of the fine polish of which it is susceptible. But the olive-tree is principally cultivated for the sake of its oil, which is contained in the pericarp or pulp. (See *Olive-oil.*) It is cultivated for this purpose in Italy, France, Spain, Malta, Turkey, the Ionian Islands, California, Florida, &c., and easily propagated either by seed, grafting, or slips. It is very tenacious of life. The fruits are also used at table, not in the natural state, but generally pickled, the green unripe fruits being deprived of part of their bitterness by soaking them in water, and then preserved in an aromatized solution of salt. Another species of olive, the *O. fragrans*, inhabits China, Japan, and Cochin-China. The flowers are used by the Chinese to mix with and perfume their tea, and also, together with the leaves, for adulterating tea. The only American species (*O. americāna*) is in some districts called *devil-wood* on account of the excessive hardness of the wood and the extreme difficulty of splitting it.

Oliven'za, a town of Spain, province of Badajoz, on the left bank of the Guadiana, 15 miles south of the town of Badajoz. Pop. 7759.

Olive-oil, a fixed oil obtained by expression from the pulp of the ripe fruit of the olive (*Olea europœa*). It is an insipid, inodorous, pale-yellow or greenish-yellow, viscid fluid, unctuous to the feel, inflammable, incapable of combining with water, and nearly insoluble in alcohol. It is the lightest of all the fixed oils. Olive-oil is much used as an article of food in the countries in which it is produced, and to a smaller extent in other countries, to which it is exported also for medicinal and manufacturing purposes, &c. The best olive-oil is said to be made in the vicinity of Aix, in France; the kind known by the name of Florence oil is also of a superior quality, and is mostly used for culinary purposes. By far the largest portion of olive-oil brought to England is imported from Italy. Spain also sends a large quantity. The oil is also known as *Sweet-oil.*

Olives, Mount of, or **Mount Olivet**, a hill on the east side of Jerusalem, from which it is separated by the Valley of Jehoshaphat and the brook Kedron. The principal summit has the name of Mount of Ascension, and here stands the modern Armenian church of that name. But according to the Scriptures the scene of the ascension was near to Bethany (Luke xxiv. 50), which is on the further side of the hill from Jerusalem. A short way above Bethany is a nearly flat part of the hill on which hundreds of people might congregate, and there is little doubt that that is truly the place from which our Lord ascended. At the foot of the hill lay the Garden of Gethsemane, and round its eastern and southern side is the road by which our Lord made his triumphal entry into Jerusalem.

Oliv'etans, an order of Benedictine monks and nuns founded about the beginning of the 14th century by Tolomei of Siena in Italy, and named from Monte Oliveto Maggiore near that city, where their first monastery was erected.

Ol'ivine, called also *chrysolite*, is a mineral, olive-green in colour, occurring in lava, basalt, and certain meteorites. Analysis proves it to be a silicate of iron and magnesium, agreeing with the general formula $(Mg.Fe)_2SiO_4$.

Olla Pod'rida, the name of a favourite dish with all classes in Spain. It consists of a mixture of all kinds of meat cut into small pieces, and stewed with various kinds of vegetables. Hence the term is also applied to any incongruous mixture or miscellaneous collection.

Ollivier (o-liv-i-ā), Émile, born at Marseilles 1825; studied for the bar and became an advocate at Paris in 1847; took part in the revolution of 1848, and was appointed commissary-general at Marseilles under the republic. He afterwards entered the legislative assembly, where he became one of the leaders of the Liberal opposition. When the empire was established in France Ollivier gradually severed himself from his former political associates, and the severance was final when he, in Jan. 1870, accepted Napoleon's invitation to form a ministry. It was this ministry which declared war with Germany in July 1870, and which, as a result of French disasters, was overthrown with disgrace in Aug. 1870.

Olmütz (ol'mûts), a city of Austria, in Moravia, 38 miles north-east of Brünn, on the March, which forms almost a complete circle around it. It has a cathedral, a fine Gothic building erected by King Wenzel III.,

who was murdered here in 1306; and its manufactures are chiefly of linen and woollen cloth. Olmütz was formerly the capital of Moravia, and is still the see of an archbishop. It is one of the strongest fortresses in Austria. Pop. 20,176.

Olonetz', a northern government of Russia; area, 57,439 sq. miles. The surface is generally flat; the drainage is shared in unequal proportions between the Baltic, White Sea, and Volga. The most marked natural feature of the government is its lakes (of which Onega is one), streams, and morasses. The climate is rigorous in the extreme. Timber constitutes almost the whole wealth of the government. The chief means of support of the inhabitants are forestry, hunting, and fishing. The capital is Petrozavodsk. Pop. 334,658.

Oloron, a town of France, department of Basses-Pyrénées, 14 miles south-west of Pau, on a hill near the Gave, here crossed by a lofty bridge connecting Oloron with Sainte Marie. It has manufactures of cutlery, blankets, &c. Pop. 7265.

Olot', a town of Spain, in Catalonia, province of Gerona, 55 miles north of Barcelona, in a basin nearly inclosed by a circle of volcanic hills. There are cotton and woollen manufactories, tanneries, &c. Pop. 9984.

Ols. See *Oels*.

Olve'ra, a town of Spain, in Andalusia, province of Cadiz, on a lofty height, 63 miles north-east of Cadiz. Pop. 8285.

Olym'pia, a locality in Greece, the scene of the famous Olympic games, a beautiful valley or plain lying in the middle portion of the ancient district of Elis, in the western part of the Peloponnesus (Morea). Here were collected thousands of statues of the gods and of victors in the games, treasure-houses full of votive offerings, temples, altars, tombs, and in a word the most precious treasures of Grecian art. Among the buildings were the Olympiēum or great temple of Zeus, containing the colossal statue of the god by Phidias; the Heræum or temple of Hera; the Metroum or temple of the mother of the gods; the twelve treasure-houses; the Prytanēum, in which the Olympic victors dined after the contests; the Bouleuterion, in which all the regulations regarding the games were made; and these were all surrounded with walls, having a length of about 1800 feet and a breadth of 1500. Recent excavations have brought to light numerous valuable fragments of sculpture, bronzes, coins, terra cottas, &c.

Olym'piads, the periods of four years between each celebration of the Olympic games, by which the Greeks computed time from 776 B.C., the first year of the first Olympiad, till 394 A.D., the second year of the 293d Olympiad.

Olym'pias, the wife of Philip II., king of Macedonia, and the mother of Alexander the Great. Her haughtiness, and more probably her infidelity, led Philip to repudiate her, and to marry Cleopatra, the niece of King Attalus. The murder of Philip, which soon followed this disgrace (B.C. 336), some have attributed to the intrigues of Olympias. After the death of her son and his successor Antipater she was besieged by Cassander in Pydna, and, having to surrender, she was put to death after a mock trial (316 B.C.).

Olympic Games, the great national festival of the ancient Greeks, celebrated at intervals of four years in honour of Zeus, the father of the gods, on the plain of Olympia (which see). The festival commenced with sacrifices, followed by contests in racing (foot, horse, chariot), wrestling, boxing, &c.; and closed on the fifth day with processions, sacrifices, and banquets to the victors. The victors by way of prize were merely crowned with garlands of wild olives; and on their return home they were received with extraordinary distinction, and enjoyed numerous honours and privileges.

Olym'pus, the name given to several mountain ranges by the ancients. The most celebrated of them was situated in Thessaly, at the eastern extremity of the range called the Cambunian Mountains, and now called by the Greeks Elymbos or Olymbos. It rises to the height of 9700 feet above the level of the sea, and was the highest mountain in ancient Greece. The earliest Greeks looked upon it as the highest of all mountains, as the central point of the earth's surface, and as the place where the gods dwelt. In after-times, when the ideas of men respecting the universe and the gods were enlarged, the supreme beings were said to reside in the exterior sphere of the heavens, revolving round the space which embraced the planets; and this new abode of the gods above the firmament of heaven received the name of Olympus. The other most important elevation bearing this name was the Mysian Olympus, a range of lofty mountains in the north-west of Asia Minor, now called Kheshish Dagh, Ala Dagh, Ishik Dagh, and Kush Dagh. Olympus in Cyprus may also be mentioned.

Om, a mystic word to which great sanctity is attached both by the Brahmans and the Buddhists.

Omagh (ō-mä′), the county town of Tyrone, Ireland, situated on the Strule, 34 miles S.E. of Londonderry. There are flax and corn mills, and a trade in leather. Pop. 4126.

O′maha, a city in the United States, the seat of Douglas county, Nebraska, situated on the Missouri, about 600 miles from its confluence with the Mississippi and 500 miles west of Chicago. It is an important railway centre for the north-west. It possesses large silver-smelting works, steam engine and boiler works, soap-works, breweries, &c., and it is the centre of a large mining and agricultural district. The population, which in 1880 was 30,000, is now (1890) 140,452. South Omaha, a suburb of the above, is now one of the largest pork and beef packing centres in the States, its population, according to census of 1890, being 8062.

Oman (o-män′), or MUSKAT, a sultanate in the south-east of Arabia, partly on the Persian Gulf, partly on the Indian Ocean; area, estimated at 82,000 square miles. The chief features of the country are stretches of barren sand or rock, mountains reaching the height of 10,000 feet; fertile valleys and plains, yielding abundance of grain, sugar, fruits, cotton, coffee, &c., Oman being the richest part of the Arabian peninsula both in agricultural products and in mineral treasures. The inhabitants are tolerant, but very superstitious and immoral. They are mostly Arabs, but there is a considerable mixture of Persians, Hindus, Africans, &c. The form of government is a monarchy (the ruler being styled Imam), limited by a powerful aristocracy with hereditary privileges, and the prescription of popular rights. Zanzibar and its dependencies formerly belonged to Oman. The capital is Muskat. Pop. (estimated), 1,600,000.

Omar I., successor of Abu-bekr, and second caliph of the Mussulmans after Mohammed. He was born about 582, became a follower of Mohammed about 615, and succeeded Abu-bekr in 634. His caliphate is celebrated for the great extension of Mohammedanism which took place while it lasted. In 638 the conquest of Syria was completed by his general Abu-Ubeida; his general Amru was equally successful in Egypt in 638 to 640; and when in 638 Jerusalem was compelled to surrender, Omar hastened thither himself in order to dictate the terms. Omar's generals likewise invaded Persia, defeated the army of Yezdegerd, and conquered the capital and kingdom. The Mussulmans pursued their conquests far into Africa, but Omar did not live long to enjoy his glory. In 644 he was mortally wounded at Medina by a Persian slave. He established the custom of dating from the Hejra.

Omar Khayyam′, Persian poet, astronomer, and mathematician, born at Nishapur in Khorasan, died there 1123 A.D. His scientific works, which were of high value in their day, have been eclipsed by his Rubaiyat, a collection of about 500 epigrams in praise of wine, love, and pleasure, and at the same time depressingly pessimistic. A portion of the Rubaiyat was translated into English verse by Edward Fitzgerald (1859–79), and a critical text and translation was made by E. H. Whinfield in 1883.

Omar Pasha. See *Omer Pasha.*

Oma′sum, the third compartment of the stomach of ruminant mammals, otherwise known as the psalterium or 'manyplies.'

Ombay′, an island in the Indian Archipelago, about 18 miles north-west of Timor. It is about 1500 square miles in extent, and is chiefly inhabited by Malays and Papuans. There is a Dutch settlement, with a trade in pepper, birds'-nests, &c.

Om′ega (Greek, signifying 'great *o*'), the name for the Greek long *o*. It was the last letter in the Greek alphabet, as alpha was the first; and from the expression in Revelation (chap. i. 8), 'I am Alpha and Omega, the beginning and the ending,' the signs A Ω became with the Christians symbolical hieroglyphics. Inscriptions on tombstones, public documents, &c., very often began with these two letters, meaning, 'In the name of God.'

O′mens, certain signs or phenomena supposed to portend some impending good or evil fortune. Among the ancient Romans the taking of omens was a public institution of great importance. See *Augurs, Auspices.*

Omer, ST., a town in France, in the dep. of Pas-de-Calais, in a marshy district on the Aa, which is here navigable, 23 miles south-east of Calais. It ranks as a fortress of the first-class, and it has a fine cathedral, and remains of the abbey church of St. Bertin, at one time the noblest Gothic monument of French Flanders. It manufactures woollen

cloth, thread, starch, &c., and has an important trade. Pop. 21,556.

Omer Pasha, a Turkish general, born in the Austrian dominions in 1806; died at Pera in 1871. Under his original name of Mikail Lattas he served for some time in an Austrian regiment; fled afterwards, for an unknown reason, into Bosnia; adopted the Mohammedan faith; taught writing in a military school; and ultimately became teacher to Prince Abdul-Medjid. When his pupil became sultan, Omer rapidly rose in rank; distinguished himself in the Syrian campaign of 1840; became military governor of Lebanon; quelled various revolts in Bosnia, Albania, &c.; and in the Russian campaign of 1853 he was appointed commander-in-chief of the Turkish army. In this capacity he made a successful stand against the Muscovite invasion, defeating the Russians at Kalafat on the Danube and at Eupatoria in the Crimea. He retired from public life in 1869.

Ommiades, or OMMEYADES (om'i-ādz), the second dynasty which held the Arabian caliphate until they in turn were superseded by the Abbasides. The founder of the dynasty was Moawiyah, who claimed the throne after the death of Othman, his cousin, and became fully recognized as caliph after the death of Ali his rival and Hussein his son. See *Caliph.*

Omnibus, a Latin word signifying 'for all,' and now applied in several languages to the well-known vehicle used for the conveyance of passengers at a cheap rate. The first conveyances of the kind were those which came into use in Paris (March, 1662) in consequence of an edict of Louis XIV., but they soon fell into disuse, and were not again reintroduced until 1827. A Mr. Shillibur started the first omnibus in London in 1829, and they were introduced into New York in 1830, and Amsterdam in 1839.

Om'phalē, in ancient Greek legend, a queen of Lydia. Hercules was sold to her for a slave by Hermes (Mercury), and performed some remarkable exploits in her service. Omphalē governed with great severity, and was both licentious and cruel.

Omsk, a chief town in the Russian government of Akmolinsk, situated in Western Siberia at the junction of the Om with the Irtish, 280 miles south-east of Tobolsk. It is an important military station, contains a school for interpreters and a military school for the Cossacks, and has a good trade. Pop. 30,890, including many exiles.

On. See *Heliopolis.*

On'ager, the wild ass (*Equus Asinus*), originally inhabiting the great deserts of Central Asia, and still found there in its wild state. See *Ass.*

Onagra'ceæ, a nat. order of polypetalous exogenous plants, herbs, trees, and shrubs, with opposite or alternate simple leaves, and often handsome flowers. They have an inferior ovary, and all the parts of the flower are four or a constant multiple of that number. The species chiefly inhabit the more temperate parts of the world, and have white, yellow, or red flowers; such as the great American genus (*Œnothēra* or evening-primroses, the common wild willow-herbs (*Epilobium*), and the fuchsias of our gardens.

One'ga, a river in Russia, which, issuing from Lake Latcha, government of Olonetz, flows first north-east, then north-west, and after a course of about 270 miles falls into the White Sea at the south-east extremity of the Gulf of Onega.

One'ga, a lake in Russia, near the centre of the government of Olonetz, and, after Lake Ladoga, the largest lake in Europe, covering an area of about 3800 sq. miles. It has numerous creeks, bays, and islands; is well supplied with fish; and discharges itself into Lake Ladoga by the Svir.

Oneglia (o-nel'ya), a seaport of N. Italy, province of Porto Maurizio. Pop. 7286.

Oneida, Madison co., N. Y., in a fine farming region. Pop. 1890, 60837.

Oneida (o-ni'da), a lake in the state of New York, United States, the western and lower end of which is about 18 miles south-east of Lake Ontario. It is 20 miles long, 4 miles broad, and its waters find a vent by Oneida River into Lake Ontario at its south-east corner, after they have united with the Seneca and formed the Oswego River.

Oneida Community, a religious communistic society, otherwise known as Perfectionists (which see).

Oneidas, once a N. American Indian tribe inhabiting Central New York. A remnant in Wisconsin are well advanced in civilization.

Oneonta, Otsego co., N. Y., on Susquehanna R. Pop. 1890, 6272.

Onion, a well-known liliaceous plant of the genus *Allium*, the *A. Cepa*, the bulbous root of which is much used as an article of food. It is a biennial herbaceous plant with long tubulated leaves, and a swelling, pithy stalk. The peculiar flavour varies much according to the size of the bulb, the small

reddish onions having much more pungency than the larger ones. The onion may be grown from the tropics to the coldest verge of the temperate zone. There are at least twenty varieties, the Bermuda Spanish, and Portuguese being among the most esteemed.

On'kelos, the author of the celebrated Targum or Chaldee paraphrase of the Pentateuch which bears his name, is asserted by the Babylonian Talmud to have lived in the time of the celebrated teacher Gamaliel, but is supposed from internal evidence to be not earlier than the 2d and not later than the 3d century. His version is so faithful, and accords so exactly with the Hebrew text, that it continued till the beginning of the 16th century to be chanted in the synagogue alternately with the Hebrew and to the same notes.

Onomac'ritos, a Greek soothsayer and poet, who lived at Athens in the time of the Pisistratidæ, arranged and explained the so-called oracles of Musæus, and having been detected making an interpolation in one of these, was banished from Athens by Hipparchus about B.C. 516. He is supposed to have been the author of the Orphic hymns.

Onomas'ticon, a Greek term properly meaning a list of names or words, denotes particularly a dictionary or encyclopædia in which individual subjects or things are mentioned and explained under their own names or head. The oldest work under this name still extant is that of Pollux, executed in the 2d century B.C., in the Greek tongue.

Onomatopœia (o-nom-a-to-pē'a), the formation of words in such a manner that the sound shall imitate the sense. Thus, in the case of sounds, the words *buzz*, *crash*, *roar*, are evidently formed to imitate the sounds themselves.

Onosan'der, more correctly ONESANDER, a writer on military tactics who lived at Rome in the middle of the 1st century after Christ, and composed in Greek, under the title of Strategetikos, an excellent work on the art of war.

Onta'rio, formerly called Upper Canada and Canada West, a province of the Dominion of Canada, having on the north-west, north, and east Manitoba, Kewatin, James Bay, the North-east Territory, and Quebec; on the south-east, south, and south-west the St. Lawrence River, and Lakes Ontario, Erie, Huron, and Superior; area, 220,000 sq. miles. Besides the great lakes just mentioned, which partly belong to the Dominion and partly to the United States, Ontario has numerous other lakes, such as Simcoe, Nipissing, Nipigon, and numerous others. The chief rivers are boundary rivers: the Ottawa, Niagara, and Albany, the latter entering James Bay, part of Hudson Bay. The Falls of Niagara in part belong to the province. There are no mountains of importance. Agriculture is the chief occupation, and for the most part the soil is of excellent quality. A large part of the province is covered with timber, and this, with the water facilities, makes lumbering one of the chief industries. The climate is inclined to the extreme of hot and cold during summer and winter respectively, but the dryness of the atmosphere makes it very healthy. The minerals include silver, copper, iron, gypsum, marble, salt, and petroleum. The richest, most thickly settled, and most highly cultivated portion of the province is the peninsula between the St. Lawrence and Lakes Ontario, Erie, and Huron. The crops raised are chiefly wheat, barley, oats, Indian corn, and potatoes, and the fruit-growing farms of some districts yield a plentiful crop of apples, plums, pears, peaches, and grapes. Latterly the farmer here has turned his attention to stock-raising and dairy-farming with encouraging results, which are largely due to the easy accessibility of markets by rail, supplemented by the lake, river, and canal navigation. Chief among the manufactures are woollens, cotton, linen, hardware, paper, soap, agricultural implements, steam-engines, &c. The educational system of the province provides for the free education of all children in the common schools, and there is also liberal government provision for high schools and colleges, technical institutions, and a university; while there are also colleges and universities not under provincial control. The government is administered at Toronto by a lieutenant-governor, assisted by an executive council of seven; while there is also a legislative assembly, elected by ballot for four years, and constituting with the lieutenant-governor the legislature or parliament. Pop. in 1881, 1,923,228; in 1891, 2,112,989.

Ontario, LAKE, the most easterly of the great lakes of North America, lying along the north-east side of the state of New York, and forming part of the boundary between the United States and Canada;

greatest length, 190 miles; greatest breadth, about 55 miles; area, 5400 square miles. It receives the waters of Lake Erie by the Niagara, and discharges its waters by the St. Lawrence into the Atlantic, 1000 miles distant. The Hudson, and the Oswego and Erie canals, form a connection through the United States between it and the Atlantic. It is navigable throughout its whole extent and at all seasons. The most important places on its shores are Toronto, Hamilton, Kingston, and Coburg, in Canada, and Oswego in the United States.

Onteniente, a town of Spain, in the province of Valencia, 46 miles south of the town of Valencia. Pop. 11,727.

Ontogen'esis, in biology, the history of the individual development of an organized being, as distinguished from *phylogenesis*, or the history of genealogical development, and from *biogenesis*, or life-development generally.

Ontol'ogy, the doctrine of being; a name given to that part of the science of metaphysics which investigates and explains the nature and essence of all things or existences, their qualities and attributes. It is also used as equivalent to metaphysics.

Onyx, a semi-pellucid gem with variously-coloured zones or veins. Any stone exhibiting layers of two or more colours strongly contrasted is called an onyx, as banded jasper, chalcedony, &c., but more particularly the latter when it is marked with white and stratified with opaque and translucent lines. The ancients valued it very highly, and used it much for cameos, many of the finest cameos in existence being of onyx.

Onyx Marble, a very beautiful translucent limestone of stalagmitic formation discovered by the French in the province of Oran, Algeria, and first brought into general notice at the London exhibition of 1862. It is used for the manufacture of ornamental articles.

Oojein. See *Ujein.*

Oolite (ō'o-līt), a species of limestone composed of globules clustered together, commonly without any visible cement or base. They vary in size from that of small pinheads to that of peas. When the grains are very distinct and well-rounded it is called roe-stone; when they are large and pea-like the rock is known as pisolite, pea-grit, or pea-stone. What is known as the Oolite or *Oolitic series* of rocks in geology, consist of a series of strata comprehending the whole of those peculiar limestones, calcareous sandstones, marls, &c., which underlie the chalk formation and rest on the Lias. It yields in England a vast quantity of excellent freestone and ironstone, and is also interesting in the highest degree for its fossils, which are numerous, varied, and in excellent condition. The strata of the series have been arranged as *Upper Oolite*, *Middle Oolite*, and *Lower Oolite.* The Oolite forms the upper division of the *Jurassic System*, so-called because the range of the Jura Mountains is almost entirely composed of such limestones.

Oomrawatee. See *Amraoti.*

Oonalashka, or UNALASKA, one of the Aleutian Islands (which see).

Oost (ōst), JACOB VAN, the Elder, one of the best Flemish painters, born at Bruges in 1600, died 1671. After laying the ground of his artistic education in his native land, he proceeded to Rome, and there became the pupil chiefly of Annibale Caracci. In his youth he was so successful a copyist of Rubens and Vandyck that his copies still deceive connoisseurs.—JACOB VAN OOST, the Younger, son of the preceding, born in 1637, studied at Paris and Rome, lived above forty years at Lille, and died at Bruges in 1713. His style is more marked, and his pencil is freer than that of his father.

Oosterhout (ō'stér-hout), a town in Holland, in the province of North Brabant, 5 miles north-east of Breda. It has potteries, breweries, tanneries, corn-mills, beet-sugar factory, and some trade in grain, cloth, and timber. Pop. 10,563.

Ootacamund, or UTAKAMAND, a sanitary station in Southern Hindustan, and the summer headquarters of the Madras government, situated in the Neilgherry Hills, 70 miles south of Mysore. It is 7228 feet above the level of the sea, and lies in an amphitheatre surrounded by noble hills overlooking an artificial lake nearly 1½ mile long. There are churches, hotels, schools, hospitals, public library, botanic gardens, &c. The mean temperature is about 58° Fahr. Pop. 12,335.

Oo'trum, a soft, white, silky, and strong Indian fibre, regarded as a promising substitute for flax, derived from the stem of *Dœmia extensa*, a plant of the nat. order Asclepiadaceæ, abundant in many parts of Hindustan.

Opah, a large and beautiful sea-fish (*Lampris luna* or *guttātus*) of the dory family, a native of the Eastern seas, but found in the Atlantic and Arctic Oceans, and sometimes,

though more rarely, on the British coasts. It is about 4½ feet long and weighs 140 to 150 lbs. Its colours are very rich, the upper part of the back and sides being green, reflecting both purple and gold, and passing into yellowish-green below, the fins bright vermilion. The flesh is highly esteemed.

Opal, a precious stone of various colours, which comes under the class of pellucid gems. It consists of silica with about 10 per cent of water, and is very brittle. It is characterized by its iridescent reflection of light. It is found in many parts of Europe, especially in Hungary, in the East Indies, &c. The substance in which it is generally found is a ferruginous sandstone. There are many varieties or species, the chief of which are: (*a*) *precious* or *noble opal*, which exhibits brilliant and changeable reflections of green, blue, yellow, and red; (*b*) *fire opal*, which simply affords a red reflection; (*c*) *common opal*, whose colours are white, green, yellow, and red, but without the play of colours; (*d*) *semi-opal*, the varieties of which are more opaque than common opal; (*e*) *hydrophane*, which assumes a transparency only when thrown into water; (*f*) *hyalite*, which occurs in small globular and botryoidal forms, with a vitreous lustre; (*g*) *menilite*, which occurs in irregular or reniform masses, and is opaque or slightly translucent. Formerly the opal was believed to possess magical virtues; thus it was believed to confer invisibility when wrapped in a bay-leaf.

Open-bill (*Anastŏmus lamelligĕrus*), an African bird of the stork family, so named from the odd formation of the beak, which at the anterior end exhibits a gap between the mandibles as if part of them were worn away though they meet at the points. Their chief food is molluscs, and perhaps this formation of bill has something to do with the opening of the shells. Another species inhabits the East Indies.

Openshaw, a town of Lancashire, England, which may be regarded as a suburb of Manchester. Pop. 16,153.

Op'era, a musical drama, that is, a dramatic composition set to music and sung on the stage, accompanied with musical instruments and enriched by the accessories of costumes, scenery, dancing, &c. The component parts of an opera are recitatives, solos, duets, trios, quartettes, choruses, &c., and they are usually preceded by an instrumental overture. The lighter kind of opera in Germany and England, as well as the French *opéra comique*, is of a mixed kind —partly spoken, partly sung. The chief varieties of opera are the *grand opera* or *opera seria*, the name given to that kind which is confined to music and singing, of which the recitativo is a principal feature; the *romantic opera*, or *opera drammatica* of the Italians, embracing an admixture of the grave and lively; the *comic opera*, or *opera buffa;* as well as many intermediate varieties. Though the Greek dramas were operatic in character, the opera proper is of modern date and of Italian origin, and would seem to have developed naturally from the miracle-play of the middle ages, the first operas dating from the 16th century. About the close of this century the poet Rinuccini wrote a drama on the classical story of Daphne, which was set to music by Peri, the most celebrated musician of the age. The orchestra of this first opera consisted of four instruments, namely, a harpsichord, a harp, a viol di gamba, and a lute. There was no attempt at airs, and the recitative was merely a kind of measured intonation. Monteverde, a Milanese musician, improved the recitative by giving it more flow and expression; he set the opera of Ariadne, by Rinuccini, for the court of Mantua; and in the opĕra of Giasone (Jason), set by Cavalli and Cicognini, for the Venetians (1649), occur the first *airs* connected in sentiment and spirit with the dialogue. The first regular serious opera was performed at Naples in 1615, and was entitled Amor non ha Legge. The first *opera buffa* is said to have been represented at Venice in 1624, where also the first stage for operas was erected in 1637. In 1646 the opera was transplanted to France by Cardinal Mazarin, about the same time to Germany, and somewhat later to England. In France there arose Lulli; in Germany, Keiser; in Italy, Scarlatti; and in England, Purcell, who are the chief operatic composers of the second half of the 17th century. The chief Italian operatic composers include, besides those already mentioned, Piccini, Jomelli, Cimarosa, Paisiello, in the last century, and Cherubini, Rossini, Bellini, Donizetti, Verdi, &c., in the present. Among the French composers are Grétry, Monsigny, Rousseau, Méhul, belonging to the 18th century, Boieldieu, Auber, Halévy, Herold, A. Thomas, and Gounod to the 19th. The chief recent composers of French comic operas are Offenbach, Lecoq, Hervé, and Bizet. Among English composers of operas may be mentioned Arne

and Shield in the last century; and of the present or recent times Balfe, Wallace, Macfarren, Sullivan, Mackenzie, Thomas, and Stanford. It is the German composers, however, who have raised opera to the highest pitch of perfection, the list including such names as Handel, Gluck, and Mozart in the last century, Beethoven, Weber, Flotow, &c., in the present. Meyerbeer, though German by birth, is to be classed rather with the modern French composers. In the most recent school of German operatic composition, at the head of which stands Richard Wagner, the vocal music of the piece is deprived of the prominent place formerly assigned to it, and is made subordinate to the other three elements of an opera—text, instrumentation, and scenic decoration.

Opéra Bouffe (buf), a farcical form of opera buffa in which the characters, subject-matter, and music is intended to burlesque the more serious style of opera. Offenbach was the creator as well as the chief master in this art. The comic operas of Gilbert and Sullivan, both in the character of the music and the libretti, stand by themselves.

Opera-glass, a small binocular telescope of a low magnifying power, so called from its use in theatres. The two tubes are connected together, and have their foci adjustable by turning a milled-headed screw between them. See *Telescope*.

Oper'culum, literally a lid or cover, and specifically applied to a horny or shelly plate developed in certain univalve Mollusca upon the hinder part of the foot, and serving to close the aperture of the shell when the animal is retracted within it. It is also applied to part of the gill-cover of fishes.

Ophicleide (of'i-klid), a brass wind-instrument of music invented to supersede the serpent in the orchestra and in military bands. It generally consists of a wide conical tube, terminating in a bell like that of a horn, with a mouthpiece and ten holes or ventages which are stopped by keys. Ophicleides are of two kinds, the bass and the alto; the former has a compass of three octaves and one note, ranging from B on the third space below the bass-staff to C on the third space of the treble-staff, including all the intermediate semitones. The alto ophicleide (an inferior instrument) has the same extent of compass but starts an octave higher.

Ophicleide.

Ophid'ia, an order of reptiles comprising the serpents. See *Serpents*.

Ophioceph'alus, a genus of fishes allied to the climbing perch, and like it able to live a long time out of the water.

Ophioglossum, a genus of ferns. See *Adder's-tongue*.

O'phir, a country or city to which the Hebrews made voyages in the time of Solomon, bringing home gold, almug-wood, and precious stones. Some identify it with the Ophir mentioned in Gen. x. 29, which was apparently situated in Arabia; while others place it in India, or in Africa.

Oph'ite, green porphyry or serpentine, a metamorphic rock of a dusky-green colour of different shades, sprinkled with spots of a lighter green. It is a hydrous silicate of magnesia with alumina and iron. Called also *Ophiolite*.

Oph'ites, a Gnostic sect of the 2d century, so called because they held that the serpent by which Eve was tempted was Christ himself, and hence regarded the serpent as sacred.

Ophiuchus (of-i-ö'kus), the Serpent-bearer, called also *Serpentarius;* one of the old northern constellations, representing a man holding a serpent, which is twined about him. The moderns, however, make a separate constellation of the Serpent.

Ophiuroi'dea, an order of the Echinodermata, comprising star-fishes known as brittle-stars and sand-stars. These animals have long slender-jointed arms, which may either be branched or simple.

Ophthalmia (Greek, from *opthalmos*, an eye), an inflammation of the mucous membrane which covers the globe of the eye, and of the corresponding surface of the eyelids. It is either acute or chronic, and its commonest cause is the presence of irritating matter between the eyelids or the exposure of the membrane to sudden cold. Its characteristic marks are pain, redness, a feeling as if sand were in the eye, and a copious flow of matter.

Ophthalmoscope, an instrument for observing the internal structure of the eye. It consists of a mirror (plane in that of Coccius, concave in that of Desmarres), by which light from an artificial source is directed into the eye of the patient, and a double-convex lens, by which the illumined parts of the structure of the eye are magnified in order that they may be more easily examined, the observer looking through a hole in the centre of the mirror. The light is

usually placed to the side of and slightly behind the patient's head.

Opie, Amelia, the only child of Dr. Alderson, a physician at Norwich, and born there in 1769, died 1853. In 1798 she married John Opie, the well-known painter, and from this period began, under the encouragement of her husband, to publish her tales of Father and Daughter, Adeline Mowbray, Detraction Displayed, and various volumes of poetry. In 1807 she lost her husband, and thereupon returned to Norwich, where she continued to reside until her death.

Opie, John, English painter, the son of a carpenter, born near Truro, Cornwall, 1761, died 1807. Having shown a precocious aptness in portrait-painting, he was taken to London in his nineteenth year by Dr. Wolcot (Peter Pindar), and there he acquired notoriety as the *Cornish Wonder*. When his portrait-painting ceased to be fashionable he devoted himself to historical and Scriptural subjects with such success that he became a Royal Academician in 1788, and was elected professor of painting to the Royal Academy in 1805. He was the author of a biography of Sir Joshua Reynolds in Pilkington's Dictionary of Painters, and his four lectures on painting, with a memoir, were published by his wife (see above).

Opinion of Counsel, the advice given by a barrister or advocate in answer to questions put with regard to a 'case' or 'memorial' prepared by an attorney or solicitor.

Opisthobranchia'ta, a division of Gasteropoda in which the gills are placed posterior to the heart.

Opisthoc'omus. See *Hoatzin.*

Opitz, or Opitius, Martin, German poet, born 1597, died 1639. He studied at Frankfort-on-the-Oder and at Heidelberg, and having afterwards visited Holland he went in 1621 to the court of the Duke of Liegnitz, whence in about a year he removed to become professor of philosophy and classical literature at the University of Weissenburg (now Karlstadt). Becoming distinguished for his talents, he went in 1625 to Vienna, where the Emperor Ferdinand II. bestowed on him the poetical crown and letters of nobility, when he assumed the title of Von Boberfeld. Among his works are a poem on Mount Vesuvius, Silvæ, Epigrams, &c.; but he is more important for the influence of his teaching regarding correctness in poetic style than for his own poems.

Opium, the inspissated juice of a species of poppy (*Papāver somnifĕrum*), cultivated on a large scale principally in Hindustan and in Asiatic Turkey, but well known in many places as a garden plant, being an annual with white, red, or violet flowers and glaucous leaves. The opium is the juice that flows from incisions made in the green heads or seed-capsules of the plant after the fall or removal of the petals, and the best flows from the first incision. The juice is at first a milky liquid, but soon solidifies and turns black, and is then scraped off and collected. It is one of the most energetic of narcotics, and at the same time one of the most precious of all medicines, and is employed in a great variety of cases, but most commonly for the purpose of procuring sleep and relief from pain. In medicine it is very commonly used in the form of *laudanum*, which is a simple tincture or extract in spirits of wine; it is also an ingredient in various *patent* and other remedies. Another opium preparation is *morphine* (which see). In its natural state opium is heavy, of a dense texture, of a brownish-yellow colour, not perfectly dry, but easily receiving an impression from the finger; it has a faint smell, and its taste is bitter and acrid. The chief active principle of opium is morphia, or morphine in combination with meconic acid. The principal part of our supply of opium is brought from Turkey, whence it is imported in flat pieces or cakes, covered with leaves. In the case of many temperaments opium produces such agreeable effects, whether a delightful dreamy calm, a state of pleasant exhilaration, or beatific visions, that numbers of persons are led to use it habitually, as others use alcohol in some form, though over-indulgence in it is attended with at least as evil effects as over-indulgence in the latter. But like tobacco it is taken by vast numbers without any apparent result one way or other. Some habitual takers of opium can take as much in a day as would kill ten or twenty persons unaccustomed to it. It is taken in two ways, known as opium-eating and opium-smoking. The habitual use of opium is most common in China, the

Opium Poppy (*Papāver somnifĕrum*).

south-east of Asia, and the Malay Archipelago, where it is chiefly smoked in a special pipe. The pipe, or rather the stem of the pipe, is about the length and size of an ordinary flute; the bowl is generally made of earthenware. The smoker, who is always lying, or at least reclining, takes a small portion of opium about the size of a pea on the end of a spoon-headed needle, heats it at a lamp, and then places it in the bowl of the pipe, the pellet of opium having previously been perforated with the needle. He then brings the opium to the flame of the lamp, inhales the smoke in several inspirations, and is then ready to repeat the process with a fresh quantity of opium until the desired intoxication ensues. Large quantities of opium are consumed in China, a great part of which comes from India, though probably as much or more is also produced in China itself. The Indian opium, however, is preferred to their own by the best judges among the Chinese. In India it is cultivated (by private cultivators) as a government monopoly, and produces a large revenue to the government (say £8,000,000 or £9,000,000 per annum).

Opodel'doc, a solution of soap and alcohol, with the addition of camphor and volatile oils. It is used externally against rheumatic pains, sprains, bruises, and other like complaints.

Opop'onax, the inspissated juice of an umbelliferous plant (*Opoponax Chironium*), a fetid gum-resin imported from Turkey, and now and again used as an antispasmodic in nervous complaints. There is a compound perfume which also receives this name.

Opor'to (Portuguese, *O Porto*, the port), a large city and seaport of Portugal, the second in the kingdom, capital of the province of Entre Douro e Minho, on a steep declivity on the right bank and about 2 miles from the mouth of the Douro, 170 miles north of Lisbon. The river is crossed by two iron bridges of recent construction, one of them, the railway bridge, especially bold and striking. The appearance of the city on a first approach is very prepossessing, but in reality most of the streets are narrow, crooked, and dirty, and the houses irregularly constructed. Among the chief buildings are the Gothic cathedral, the church of S. Francisco (Gothic), the bishop's palace, an enormous building, the English club, the exchange, and the Torre dos Clerigos, a granite tower 210 ft. high. There are also museums, a large library, medical college, Crystal Palace and fine garden, &c. The principal trade is in wine, white and red, but chiefly the latter (*port* wine, so named from this town), which is principally exported to Britain. There are some manufactories of hats, silks, cotton, woollen, and linen stuffs, pottery, lace, glass, leather, and paper, &c. Oporto was at one time the capital of Portugal. In 1809 Wellington drove the French out of it after the remarkable passage of the Douro. Pop. 105,838.

Opos'sum, the name of several species of *Didelphys*, a genus of marsupial mammals, having four *hands* and a long prehensile tail. They are nocturnal animals, arboreal in their habits, living constantly on

Virginian Opossum (*Didelphys virginiana*).

trees, and there pursuing birds, insects, &c., although they do not despise fruit. The females of certain species have an abdominal pouch in which are the mammæ, and in which they can inclose their young. The best-known species of opossum is the *Didelphys virginiana*, very common in the United States. It is almost the size of a large cat, the general colour whitish-gray, and the whole hair of a wool-like softness. On the ground the motions of the opossum are awkward and clumsy, but on the branches of a tree it moves with great celerity and ease, using the prehensile tail to assist its motions. When caught or threatened with danger the opossum counterfeits death, and 'playing 'possum' has on this account passed into a proverb as used to indicate any deceitful proceeding. The female has from ten to fifteen young, which are for a long time nourished in the pouch, to which they resort when alarmed.

Opossum-shrimp, the popular name of several species of *Mysis*, a genus of small crustaceans. They receive their name from

the females carrying their eggs and young in a pouch between the thoracic legs.

Oppeln, a town in Prussian Silesia, on the Oder, 53 miles south-east of Breslau. It has an old royal castle, gymnasium, hospital, &c.; tobacco-factory, cement and soap works, breweries, limekilns, and some shipping trade. Pop. 14,447.

Oppenheim (-him), an old town of Germany, in Hesse, on the left bank of the Rhine, 12 miles south of Mainz, on the slope of a hill abounding in vineyards, a place of considerable historical importance in the Thirty Years' war and later. Pop. 3452.

Oppian, the name of two Greek authors, one of whom wrote a poem entitled Halieutica (Fishing), and the other a poem on Cynegetica (Hunting). The author of the Halieutica flourished about 170 A.D. His poem consists of about 3500 lines, divided into five books. The author of the Cynegetica was born at Apamea or Pella, in Syria, and flourished about 210 A.D. His work, which was dedicated to the Emperor Caracalla, is composed of four books containing 2100 hexameter lines. There is also a prose paraphrase of a poem on Hawking, attributed to Oppian; but it is doubtful to which of the two it belongs.

Opposition, in astronomy, the situation of two heavenly bodies when diametrically opposed to each other, or when their longitudes differ by 180°. Thus there is always an *opposition* of sun and moon at every full moon; also the moon or a planet is said to be in *opposition* to the sun when it passes the meridian at midnight. See *Conjunction*.

Opposition, in politics, the party who, under a constitutional government, are opposed to the existing administration, and who would probably come into power on its displacement. Although at an early period in English history rival political parties existed, yet a regular opposition, in the modern sense of the word, may be said to date from the accession of the house of Hanover.

Ops, the Roman female divinity of plenty and fertility. She was regarded as the wife of Saturn, and, accordingly, as the protectress of everything connected with agriculture.

Op'tative, in grammar, that form of the verb in which wish or desire is expressed, existing in the Greek and some other languages, its force being conveyed in English by such circumlocutions as 'may I,' 'would that he,' &c.

Optics is the branch of physics which treats of the transmission of light, and its action in connection with the laws of reflection and refraction, including also the phenomena of vision. A *ray* of light is the smallest conceivable portion of light, and is represented by the straight line along which it is propagated. A *pencil* of light is a collection of such rays; it is *parallel* when all the component rays are parallel to each other; *converging* when they all proceed to a single point; and *diverging* when they all proceed from a single point. The *focus* of the pencil is the point to or from which the rays proceed. Any space or substance which light can traverse is in optics called 'a medium.' When light falls on any surface a certain portion of it is *reflected* or sent back, and it is owing to this reflected light that objects are visible. When light falls upon the surface of a solid substance or medium that it can traverse (a transparent substance), one portion greater or less is directed or reflected back into the medium whence it came; another portion is transmitted through the solid medium, but undergoes a change called *refraction;* while a third portion is absorbed in the new medium. When all the minute parts of a surface give out rays of light in all directions we call it a luminous surface, whether it is self-luminous or is merely reflecting the light from a self-luminous body such as the sun. The *law of reflection* is that the angle of incidence and that of reflection are in the same plane, and that the angle of reflection is equal to the angle of incidence, and on the opposite side of the perpendicular. This law holds true whatever be the nature of the

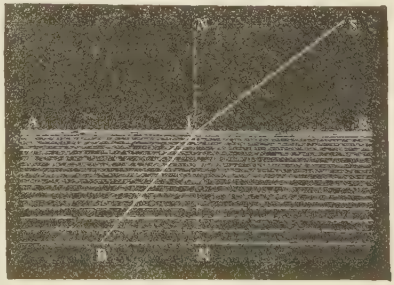


Fig. 1.—Refraction.

reflecting surface or the origin of the light which falls upon it. *The law of refraction* comes into operation when a ray of light passes through a smooth surface bounding

two media not homogeneous, such as air and water, or when rays traverse a medium, the density of which is not uniform, as the atmosphere. When the ray of light passes from a rarer into a denser medium, it is bent or *refracted* towards the perpendicular line drawn through the point of incidence, or the angle of refraction is less than the angle of incidence. On the contrary, when a ray of light passes from a denser into a rarer medium the refraction is from the perpendicular, or the angle of refraction is greater than the angle of incidence. If one medium is a liquid and the other air, as in the accompanying figure (fig. 1), the ray RI in the liquid will make a smaller angle with the normal NIN than the ray SI in air, and *vice versa*.

The law of reflection is illustrated especially by the action of mirrors. When a pencil of rays from a luminous point falls on a plane mirror each ray is reflected according to the law given above, and it is easy to show by geometry that the pencil which was divergent before incidence has exactly the same divergence after reflection; but the rays now seem to have proceeded from a point behind the mirror. This point is called the 'virtual image' of the first point (being not a *real* image of it); the line joining the points is at right angles to and is bisected by the mirror. Now a luminous object is made up of points, each of which sends a divergent pencil to the mirror, which seems after reflection to proceed from a point behind the mirror, and hence a luminous object sends rays to a plane mirror which after reflection seem to have proceeded from a luminous object behind the mirror. An eye receiving a ray (or a small pencil of rays) gets the impression that the luminous point from which it was sent is somewhere in the line of the ray just before reaching the eye, and hence an eye in such a position as to receive after reflection a few rays from every point of the object sees the image of the object. (See fig. 2.) Besides plane mirrors concave and convex mirrors are often used in optics. When a mirror is not plane the incident rays from a luminous point in general neither converge to a single point after reflection nor diverge as if they had come from a virtual image. But when a concave mirror forming a small portion of a spherical surface is used we find that all the rays falling upon it from a luminous point converge so nearly to a luminous point after reflection that their 'aberration' (as the non-convergence of the rays is called) may be neglected in practice. The line joining the centre of the spherical surface with the

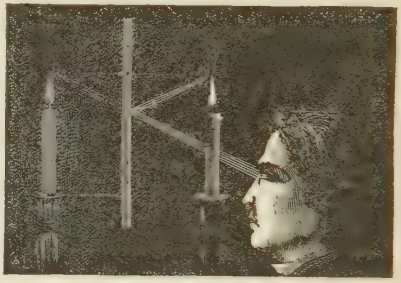


Fig. 2.—Reflection (Plane Mirror).

'pole' of the mirror (that is, the middle point of the reflecting surface) is called the *principal axis*. Any bundle of rays parallel to the principal axis converges after reflection to a point in the axis called the *principal focus;* and any bundle of parallel rays converges after reflection to a focus which is at the same distance from the mirror as the principal focal distance. When the object from which the rays proceed is at a considerable distance, an inverted image of it will be formed midway between the centre of curvature and the mirror. When the object is only at a moderate distance, but exceeding half the radius of curvature, an inverted image is still formed in front of the mirror, being diminished when nearer the mirror than the object is, and magnified when farther away than the object. The

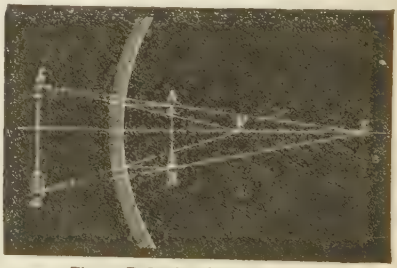


Fig. 3.—Reflection (Concave Mirror).

image of an object placed nearer a concave mirror than the principal focus is erect and larger than the object, and is 'virtual' as in fig. 3, where AB is the object, *ba* its

image (inverted), F the focus, C the centre of curvature. The image of any object in a convex mirror is also virtual and erect; it is, however, smaller than the object.

When the two faces of a piece of glass through which light is refracted are both of them plain, it is called a *plate* if they are parallel, and a *prism* if they are not parallel. When the faces are curved, or one of them curved and the other plain, it is called a *lens*. Prisms are the essential parts of the apparatus used for decomposing light and examining the properties of its component parts, as in spectrum analysis. (See *Light*.) A lens may be regarded as consisting of an unlimited number of prisms, the angles between their faces gradually diminishing the farther away from the axis of the lens. It is the property of convex lenses to diminish the divergency of the pencils of light, of concave lenses to increase that divergency. It is the duty of a convex lens to make rays parallel to the axis falling on one face of it converge accurately to one point after emerging from the other face. This point is called the principal focus, and is the point where a 'real' image would be formed. When rays parallel to the axis pass through a concave lens they diverge, and if produced backwards in the direction from which they come they would meet at one point, which in this case also is called the principal focus; but it is only a virtual focus, because the rays themselves do not pass through it, but only their backward productions. Thus concave lenses bend rays from the axis, and convex ones bend them towards it. When we look through a concave lens it makes objects seem smaller whatever their distances are. When we look through a convex lens at an object between the lens and the principal focus it appears larger than it really is, and hence the use of such lenses in magnifying-glasses, microscopes, and telescopes. The rule as to the relative size of object and image will be understood from fig. 4, where the small arrow AB is the object, and the large arrow its image, O being the centre of the lens, F*f* its foci. Rays from AB are refracted towards the axis by the lens, and as the *visual angle*, or angle made by the rays at the eye, is larger than if there were no lens, the object appears magnified. The length of the object and the image will be directly as their distance from O; so that if the image is three times as far from the lens as the object, it will be three times as long and three times as broad. *Convex* lenses are used in spectacles for long-sighted (or *old*-sighted) persons, because the lens of their eye is too much flattened, and does not of itself cause a sufficient convergency of the rays to make an image on the retina, but

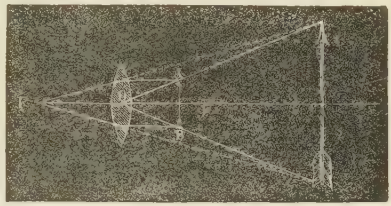


Fig. 4.—Magnification of near Object by Convex Lens.

one that would fall behind it. *Concave* lenses, again, are used by near-sighted persons, because the rays in their case converge so much as to make an image in front of their retina instead of on it. See *Eye, Light, Microscope, Telescope, Spectroscope*, &c.

Op'timism, that philosophical doctrine which maintains that this world, in spite of its apparent imperfections, is the best possible. It is an ancient doctrine; among modern philosophers Leibnitz is its principal advocate.

Optom'eter, an instrument for measuring the extent of the limits of distinct vision in different individuals, and consequently for determining the focal lengths of lenses necessary to correct imperfections of the eye.

Opun'tia, a genus of plants of the Cactus order, having stems consisting of flat joints, broader above than below, but ultimately in process of growth losing this appearance. Their native country is South America. Many have handsome flowers, and some of them yield a pleasant subacid fruit. *O. Tuna* is cultivated in Mexico for the cochineal insect. A common name of this species is prickly-pear or Indian-fig. See *Indian-fig, Prickly-pear*.

Or, in heraldry, the tincture that represents gold. See *Heraldry*.

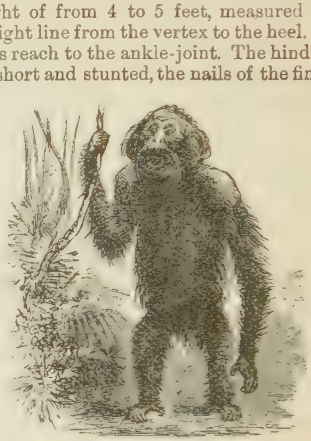
Orach, ORACHE (or'ach), is the popular name of several plants of the genus *Atriplex*, order Chenopodiaceæ, plants with mealy foliage, generally growing near the sea. A cultivated species (*A. hortensis*) is known as garden or mountain spinach, being used like spinach.

Or'acles, the answers which the gods of the Greeks, Romans, Egyptians, &c., were supposed to give, by words uttered or other-

wise, to those who consulted them upon any occasion; also the places or sources whence these answers were received. The credit of oracles was so great that vast numbers flocked to them for advice. Scarcely any war was waged, or peace concluded, or new form of government instituted, or new laws enacted, without the advice and approbation of some oracle. The Greek oracles were the most celebrated, the earliest being that of Zeus (Jupiter) at Dodona. Of the other gods Apollo had many oracles, but that at Delphi held the first place, and it was often applied to for explaining obscure answers obtained at Dodona. Another famous oracle of Apollo was in the island of Delos. The Romans had no important oracles of their own, but had recourse to those of Greece and Egypt. The early Christians ascribed the oracles in general to the operation of the devil and his agents; but the practices of the priests, the manner and circumstances of delivering the oracles, the ambiguity of their answers, and the art of accommodating them to all events, amply demonstrate their human origin; yet they long maintained their standing, and sunk only with the freedom and independence of Greece. Under the reign of Theodosius the temples of the prophetic deities were shut up or demolished.

Oran', a seaport of Algeria, capital of province of same name. The town rises in the form of an amphitheatre, has now largely a European character, and is strongly fortified. The harbour was formerly at Mers-el-Kebir, about 5 miles north-west of the town, but recently excellent accommodation for shipping has been provided at Oran itself. Oran has a large trade. Chief exports: cereals, esparto and alfa grass, wine, olives, &c. Pop. 67,681, of whom about three-fourths are Europeans.—The province, forming a long belt along the Mediterranean, has an area of 44,616 sq. miles and a population (1891) of 942,066.

Orang', or ORANG-OUTANG, a quadrumanous mammal, the *Pithēcus satўrus* or *Simia satўrus*, one of the anthropoid or man-like apes or monkeys. This animal seems to be confined to Borneo, Sumatra, and Malacca. It is one of those animals which approach most nearly to man, being in this respect only inferior to the chimpanzee and gorilla. It is utterly incapable of walking in a perfectly erect posture. Its body is covered with coarse hair of a brownish-red colour; in some places on its back it is 6 inches long, and on its arms 5 inches. The face is destitute of hair save at the sides. It attains the height of from 4 to 5 feet, measured in a straight line from the vertex to the heel. The arms reach to the ankle-joint. The hind-legs are short and stunted, the nails of the fingers



Orang-outang (*Pithēcus satўrus*).

and toes flattened. They swing themselves along from tree to tree by the aid of their long arms, but their gait on the ground is awkward and unsteady. At birth the head of the orang resembles that of the young child. These apes are remarkable for strength and intelligence, and capable of being highly domesticated if captured young. They feed chiefly on fruits and sleep on trees. See also *Man*, *Apes*, *Monkeys*.

Orange, the fruit of the *Citrus Aurantium*, and the shrub or tree itself, natural order Aurantiaceæ. The orange is indigenous in China, India, and other Asiatic countries, and was first introduced in Portugal about 1520. It is now extensively cultivated in Southern Europe. In Portugal and Spain the fruit forms an important article of commerce. Large quantities are also produced in the Azores, in Africa, America (especially in Florida), and the West Indies, in Australia and the Pacific Islands. The tree is a middle-sized evergreen, with a greenish-brown bark. The leaves are ovate, acute, pointed, and at the base of the petiole are winged. The white flower exhibits a calyx with five divisions, a corolla with five imbricate petals, stamens equal in number to the petals or a multiple of them, and along with the petals inserted on a hypogynous disc, the filaments being united in several bundles. The fruit is globose, bright yellow, and contains a pulp which consists

of a collection of oblong vesicles filled with a sugary and refreshing juice; it is divided into eight or ten compartments, each usually containing several seeds. The principal varieties are the common sweet or China orange, the bitter or Seville, the Maltese or red pulped, the Tangerine, the Mandarin or clove, and the St. Michael's. The leaves, flowers, and rind yield fragrant oils much used in perfumery and for flavouring essences. The wood is fine-grained, compact, susceptible of a high polish, and is employed in the arts. The citron and lemon are allied fruits.

Orange, a small and ancient principality in South-eastern France, which from the 11th to the 16th century had its own princes. By the Peace of Utrecht (1713) it was ceded to France. The reigning dynasty of the Netherlands is of the house of Orange, and the heir-apparent bears the title of *Prince of Orange*. See also next article.

Orange (the ancient *Arausio*), a town of France, department of Vaucluse, 18 miles north of Avignon. It was for a long time the capital of the principality of the same name, and is now chiefly celebrated for its architectural remains of the Roman period. Pop. 6860.

Orange, a city of the United States, New Jersey, 16 miles west of New York. It is picturesquely situated on elevated ground, and contains many fine residences, being a favourite resort of New York city men. Pop. 1890, 18,844.

Orange-bird (*Tanagra zena*), a Jamaican bird so called from its orange-coloured breast.

Orange Free State, a republic of South Africa. It has Cape Colony on S. and S.W., Bechuanaland on N.W., Transvaal on N., Natal on E., Basutoland on S.E.; area estimated at 48,326 sq. miles, divided into nineteen districts; pop. 1890, 207,503, of whom 77,716 are whites. It was founded in 1835–36 by Dutch settlers from Cape Colony, annexed by Britain in 1848 in order to put a stop to the Boer outrages upon natives; but in 1854 it was recognized as an independent state. Lying about 5000 feet above the sea-level, the country, chiefly vast undulating plains, is cold in winter, with violent thunder-storms and long droughts in summer. It is, however, very healthy, and favourable to European constitutions. Pasturing is the chief occupation, and wool, hides, and ostrich feathers the principal exports. Diamonds and other precious stones have been found in paying quantities, rich coal-mines exist, and the state is said to abound in other mineral wealth. Gold was discovered in 1887. The executive is vested in a president and a council; the legislative functions in the Volksraad, an assembly of fifty-six members, elected by universal suffrage. The Dutch Reformed Church is the dominant religion, and a Dutch dialect the language of the country. Capital, Bloemfontein, pop. 3270. The country may now be reached by railway from Port Elizabeth.

Orange-lily (*Lilium bulbiferum*), a species of lily having a scaly bulb, a leafly stem 2½ feet high, small dark-brown bulbs in the axils of the leaves, and large orange-coloured flowers.

Orangemen, the members of a secret society founded in the north of Ireland in 1795, to uphold the Protestant religion and political ascendency, and to oppose the Catholic religion and influence and their secret societies. The title of the association was adopted in honour of William III. of England, prince of Orange. The head of the association is the Imperial Grand Lodge with its imperial grand-master; then there are grand lodges, grand county lodges, district and subordinate lodges, spread over Ireland, Great Britain, and some of the colonies, especially Canada, but the chief strength is in the north of Ireland. In 1835 the society was dissolved in consequence of intrigues in the army, but revived in 1845. Great demonstrations take place annually on the 12th of July, the anniversary of the battle of the Boyne, and where the Catholic and Protestant parties are both in considerable strength the processions of either party are the cause of serious disturbances.

Orange River, or GARIEP, a river in South Africa, forming part of the north boundary of Cape Colony, and falling after a total course of about 650 miles into the Atlantic. It is formed by the junction of the Ky Gariep, or Vaal River, with the Nu Gariep, Black or Cradock River, both of which have their sources in the Drakensberg or Quathlambu Mountains, near the same locality. Its volume varies greatly, and it is of no use for navigation.

Orato'rio (Italian, *oratorio*, a small chapel, the place where these compositions were first performed), a sacred musical composition consisting of airs, recitatives, duets, trios, quartetts, choruses, &c., with full orchestral

and sometimes organ accompaniment, the subjects being generally taken from Scripture. Its origin has been usually ascribed to St. Filippo de Neri, who, in 1540, founded the congregation of the Oratory in Rome, one of the objects of which was to render religious services as attractive as possible. Its increasing popularity induced poets of eminence to supply texts for these works, and Metastasio wrote a number of oratorios. The oratorio was introduced into England in 1720, when Handel set Esther (Racine's tragedy adapted by Humphreys) for the chapel of the Duke of Chandos. It was performed by the children of the Chapel Royal in 1731, and in 1732 was publicly produced. Among the most notable productions are the Messiah and Israel in Egypt, by Handel; the Creation, by Haydn; the Mount of Olives, by Beethoven; the Last Judgment, by Spohr; Saint Paul and Elijah, by Mendelssohn. Among the oratorios by living composers may be mentioned The Light of the World and The Prodigal Son, by Sir Arthur Sullivan, The Rose of Sharon, by A. C. Mackenzie; The Deluge and Ruth, by F. H. Cowen. At the musical festivals throughout England oratorios are performed on a large scale; at the triennial festivals in the Crystal Palace the band and chorus amount on an average to nearly 4000 performers. In America and Germany the oratorio is almost as popular as in England.

Oratory, an apartment in a private house or building designed for domestic worship. It differs from a chapel inasmuch as it contains no altar, nor may mass be performed in it.

Oratory, PRIESTS OF THE, a religious order founded in Rome by St. Filippo de Neri in 1570, for the study of theology, and for superintending the religious exercises of the devout, visiting the sick, &c. The members live in community, but are not bound by monastic vows; they are at liberty to withdraw at any time, and pay a fixed sum towards the common expenses.

Orbiculi'na, a genus of minute foraminifers, found alive in tropical seas, as also fossil in the tertiaries. They have their name from their flattened globular shape.

Orbit, in astronomy, the path of a planet or comet; the curve-line which a planet describes in its periodical revolution round its central body. The orbits of the planets are elliptical, having the sun in one of the foci; and the planets all move in these ellipses by this law, that a straight line drawn from the centre of the sun to the centre of any one of them, termed the *radius vector*, always describes equal areas in equal times. Also, the squares of the times of the planetary revolutions are as the cubes of their mean distances from the sun. The satellites also move in elliptical orbits, having their respective primaries in one of the foci. The *elements of an orbit* are those quantities by which its position and magnitude, for the time, are determined; such as the major axis and eccentricity, the longitude of the node, and inclination of the plane to the ecliptic, and the longitude of the perihelion.

Or'cades. See *Orkney Islands.*

Orcagna (or-kän'yä), ANDREA DI CIONE, born about 1308, died about 1386, one of the greatest of the early Florentine artists after Giotto. Painting, sculpture, architecture, and mosaic work were all within the sphere of his artistic genius; and his productions compare favourably with the best of a period so rich and distinguished in the art of Italy. As a painter he executed the beautiful frescoes in the church S. Maria Norella at Florence; the chapel San Michele and its magnificent tabernacle in the same city are grand memorials of his architectural and sculptural talent. His style is remarkable for exquisite design, graceful pose, and delicate execution. Boccaccio has perpetuated his name in his Decamerone.

Orchard, an inclosure devoted to the culture of fruit-trees, especially the apple, the pear, the plum, the peach, and the cherry. The most suitable position for an orchard is a declivity lying well exposed to the sun and sheltered from the colder winds, but yet not too much shut in. The soil should vary according to the kind of fruit cultivated, and it is generally allowed to produce only grass besides the fruit-trees. Fruit cultivation is carried on most extensively on the continent of Europe and the United States; but in Great Britain the area of orchards is comparatively limited, although the flavour of the fruit produced is of the very best. The chief fruit-growing States are New York, Ohio, Michigan, Illinois, Pennsylvania, Delaware, New Jersey, Maryland, Indiana and California.

Orchard-house, a glass-roofed shed designed for the cultivation of fruits to greater advantage than in the open air. The fruit-trees in it are not allowed to attain any great size. They are planted in pots which have a large hole in the bottom, and through this the smaller roots pass to take nourishment

from a specially prepared soil below. These roots are cut off after the fruit is gathered, and the trees then rest during the winter.

Orchardson, WILLIAM QUILLER, R.A., subject-painter, born in Edinburgh 1835. He painted portraits and exhibited in the R.S.A. till 1863, when he removed to London. He became an associate of the Royal Academy in 1868, and full academician in 1879. He is among the first of British incident painters, a fine colourist, and most of his works are skilfully dramatic and picturesque. Among his more notable pictures are The Challenge, Christopher Sly, The Queen of the Swords, Napoleon on Board the Bellerophon, Un Mariage de Convenance, Salon of Mme. Recamier, The First Cloud, and The Young Duke.

Orchella (or-kel'ä), name of several species of *Roccella*, a genus of lichens, originally brought from the Levant, and employed from very early times as a dye agent. Large quantities are gathered in the maritime rocks of the Canary and Cape Verde Islands. A purple and a red dye, known as orchil or archil, are prepared from them.

Orchestra (or'kes-tra), the space in theatres between the seats occupied by the spectators and the stage, appropriated by the Greeks to the chorus and the musicians, by the Romans to the senators, and in our modern theatres to the musicians. The name is also used for the part of concert-rooms assigned to the vocal and instrumental performers; and, lastly, is applied to the instrumental performers, collectively taken. A modern orchestra in the last sense consists of stringed, wind, and percussion instruments, in varied proportions, according to the number of instrumentalists. The stringed instruments should greatly outnumber the wind instruments, and those latter the instruments of percussion.

Orchha (orch-hä'), native state in Central India. It lies to the south of the British district of Jhansi, being much intermixed with that district; area 2000 sq. miles, pop. 311,514. The chief towns are Tehri, the present capital, and Orchha, the old capital. Pop. of latter, 18,344.

Orchidaceæ (or-ki-dā'sē-ē), or ORCHIDS, an extensive order of endogens (nearly 2000 species being known), consisting of herbaceous plants or shrubs, with fibrous or tuberous roots; a short stem or a pseudobulb; entire, often sheathing leaves; and showy flowers, with a perianth of six segments in two rows, mostly coloured, one, the lowest, generally differing in form from the rest, and often spiral. The essential form of these flowers is determined by the presence of this six-segmented perianth, the three outer segments of which are a kind of calyx, the three inner forming a kind of

Butterfly Orchid (*Oncidium Papilio*).

corolla. By adhesion or abortion the parts of the perianth are sometimes reduced to five or three, and springing from its sides are the six stamens whose anthers contain pollen-grains. They are natives of all countries, but very cold and dry climates produce but few species; some of them grow in the ground, but a large number are epiphytes, growing upon trees; and it is above all in the great virgin forests of South America and of the East Indies that the orchids abound. The orchids attract much attention, and are cultivated with zeal on account of the beauty or curious shapes of the flowers (which often assume the forms of reptiles, insects, and other denizens of the animal kingdom), or for their not unfrequently fragrant smells. The cultivation of orchids has of recent years become a sort of mania, large sums being often paid for new or rare varieties. The nutritive substance called salep is prepared from the roots and tubers of several species; the fragrant vanilla is obtained from two species of a genus of that name. The figure gives an illustration of one interesting species; for others see *Orchis* and *Vanilla*.

Orchil (or'kil). See *Archil*.

Orchis, the typical genus of the order Orchidaceæ, comprising hardy perennials with tuberous fleshy roots, containing much

starch: natives of Europe, temperate Asia, and a few of N. America. *O. spectabilis*, a pretty little plant, is found in shady woods

The Salep Orchis (*Orchis mascŭla*).

and among rocks. *O. mascŭla* yields salep. See *Orchidaceæ*.

Orcin, or ORCINE ($C_7H_8O_3$), a peculiar colouring matter obtained from orchella. When exposed to air charged with vapours of ammonia it assumes by degrees a fine violet colour; when dissolved in ammonia it acquires a deep blood-red colour.

Orcus, a name among the Romans for Tartarus or the infernal regions.

Ordeal, an ancient form of trial to determine guilt or innocence, practised by the rude nations of Europe, in the East, and by the savage tribes of Africa. In England there were two principal kinds of ordeal, *fire-ordeal* and *water-ordeal;* the former being confined to persons of higher rank, the latter to the common people. Both might be performed by deputy, but the principal was to answer for the success of the trial. Fire-ordeal was performed either by taking in the hand a piece of red-hot iron, or by walking barefoot and blindfold over glowing coals or over nine red-hot ploughshares laid lengthwise at unequal distances; and if the person escaped unhurt, he was adjudged innocent, otherwise he was condemned as guilty. Water-ordeal was performed either by plunging the bare arm to the elbow in boiling water, escape from injury being considered proof of innocence; or by casting the person suspected into a river or pond, and if he floated without an effort to swim it was an evidence of guilt, but if he sunk he was acquitted. It was at last condemned as unlawful by the canon law, and in England it was abolished by an order in council of Henry III. As success or failure, except in a few cases, depended on those who made the requisite preparations, a wide field was opened to deceit and malice. Besides these ordeals there were a variety of others practised in many countries, such as the corsned or hallowed morsel trial, the trial by touching the dead body of a person murdered, which was supposed to bleed if touched by the murderer, the ordeal by swallowing certain herbs and roots, &c. After the 14th century ordeals became more and more uncommon. In the 16th century only the trial of the bier was used, and this continued even into the first part of the 18th. In consequence of the prevalent belief in sorcery or witchcraft the ordeal by cold water was long retained in the trials of witches. These foolish customs were gradually done away, but isolated cases in some of the benighted countries of Europe happened until a comparatively recent period. Ordeals are still found in many nations out of Europe, as in West Africa and other parts of that continent. In Madagascar till lately trial by ordeal (swallowing the poison of the tree *Tanghinia venenōsa*) was in regular use. The Chinese still retain the ordeal of fire and water, and various ordeals are practised among the Hindus.

Ordeal-bean, ORDEAL-NUT, the seed of the Calabar bean. See *Calabar Bean*.

Ordeal-root, the root of a species of plant of the genus *Strychnos*, used as an ordeal in W. Africa.

Ordeal Tree, a name of two poisonous trees: *Erythrophlæum guineense* of Guinea and *Tanghinia venenōsa* of Madagascar. See *Erythrophlæum*, *Tanghin*.

Order, in zoology and botany, a subdivision of a class or large division of animals or plants, which, although agreeing in the characters common to the whole class, yet are more closely allied by some very special features in their economy. Thus in the class Mammalia we have the order of the Quadrumana or Monkeys; in the class of Birds we have the order of Natatores or Swimming Birds, in the class of Monocotyledonous Plants the order Liliaceæ, &c. The order itself is divided into subordinate groups named genera. See *Genus*.

Order'icus Vita'lis, an Anglo-Norman historian, born in the neighbourhood of Shrewsbury in 1075, his mother being English, his father Norman. He received his education in the Abbey of St. Evroul (Normandy), where the name Vitalis was conferred on him, and in due time became a

priest. He wrote in Latin an ecclesiastical history in 13 books, from the birth of Christ down to his own time. The later books are valuable to the historical student, as they offer a good description of the life and times of William the Conqueror, of William II., and of the first of the Crusades. He died after 1143.

Or'derlies, in the U. States army, are privates and non-commissioned officers selected to attend upon general and other officers, for the purpose of bearing their orders and rendering other services. The *orderly officer*, or officer of the day, is the officer of a corps or regiment, whose duty is to superintend its interior economy, as cleanliness, quality of the food, &c. An *orderly book* is provided by the captain of each company or troop, in which the general or regimental orders are entered.

Order of the day, in legislative language, is a bill or other matter which the House has ordered to be discussed on a particular day. The same term is also used in the same sense in the proceedings of municipal bodies.

Orders, Holy, a term applied to the different ranks of ecclesiastics. The Anglican and other Reformed Episcopal churches recognize only the three orders of bishops, priests, and deacons. The Roman Catholic Church admits of seven orders: four minor or secular—doorkeeper, exorcist, reader, and acolyte; and three major—deacon, priest, and bishop. The Greek Church has also the distinction of major and minor orders, but the functions of the four minor orders of the R. C. Church are united by the Greeks in the single order of reader. The term *holy orders*, or simply *orders*, is also used as equivalent to the clerical character or position, as 'to take orders,' 'to be in orders.'

Orders, Military, fraternities or societies of men banded together in former times for military and partly for patriotic or Christian purposes. Free birth and an irreproachable life were the conditions of admission. The chief were the Templars, the Teutonic Knights, and the order of St. John of Jerusalem.

Orders, Religious, are associations, the members of which bind themselves to lead strict and devotional lives, and to live separate from the world. Prior to their formation there were only the Hermits or Anchorites. (See *Monastery.*) The entry into religious orders, from their foundation to the present time, is preceded by the taking of the monastic vow, which enjoins residence in a monastery, celibacy, renunciation of worldly pleasures, the duty of prayer, fasting, and other austerities, and unconditional obedience to superiors. These conditions form the basis of the majority of orders, some being more austere in their observances than others. The first properly constituted religious order was founded in the 4th century by St. Basil. The Basilians are now chiefly confined to the Greek Church in the East. In the time of Justinian (530) St. Benedict established a new order, the Benedictines, under a set of rules based principally on those of St. Basil, and for some 600 years after the greatest number of European monks followed his statutes. According to some authorities as many as 23 orders sprung from this one. About 1220 the Dominicans and Franciscans originated by taking amended rules from their leaders. These rules, especially those of the Dominicans, were more austere, including perpetual silence, total abstinence from flesh, and the wearing of woollen only, and they were not allowed to receive money, and had to subsist on alms, being thus *mendicant* orders. The orders mentioned are the fountain-heads of numerous others which arose to accommodate the changing times, the altered conditions of countries, and the particular policies of the church. Modified orders of the Benedictines are, for instance, the Camaldulians or Camaldolites, the Carthusians, the Celestines, the Cistercians, the Bernardines, Feuillants, Recollets, the nuns of Port Royal, and the Trappists. The reputed rules of St. Augustine were accepted by a large number of religious orders, but the monks, who were reckoned among the laity in the 7th century, could not adopt them, as they were designed for the clergy only. In the 8th century the monks began to be viewed as members of the clerical order, and in the 10th, by receiving permission to assume the tonsure, they were formally declared clergymen. Indeed, public opinion and several papal bulls placed them, as superior in sanctity, above the secular clergy, who for this reason often became monks. The Præmonstratenses, Augustines, Servites, Hieronymites or Jeronymites, Jesuits, and Carmelites are regular orders, according to the rules of St. Augustine. Suborders of the Franciscans are the Minorites, Conventuals, Observantines, Fraticelli, Cordeliers, Capuchins, Minims, &c. As the secluded life of the monks, soon after the origin of monasteries, had given rise to similar

associations of pious females, so nuns commonly banded together as new orders of monks arose, and formed societies under similar names and regulations. Thus there were Benedictine, Camaldulian, Carthusian, Cistercian, Augustine, Præmonstratensian, Carmelite, Trinitarian, Dominican, Franciscan nuns, and many orders of regular canonesses. There were also congregations of nuns who united with certain orders of monks without adopting their names. The Ursuline and Hospitaller nuns, or Sisters of Mercy, are female orders existing independently of any male orders, and living according to the rules of St. Augustine. Almost all the important religious orders received new accessions in the lay brethren and lay sisters, who were taken to perform the necessary labours of the monasteries, and to manage their intercourse with the world. The orders first established governed themselves in an aristocratico-republican manner. The Benedictine monasteries were long independent of one another. The Cistercians obeyed a high council made up of the superior, and other abbots and counsellors, and these were again responsible to the general chapters. The four mendicant orders, the Dominicans, Franciscans, Augustines, and Carmelites, at their very commencement placed themselves in a much more intimate connection with the popes. Dependent solely and immediately on Rome, they preserved the strictness of their organization with a success which could be maintained only by the unity of the ruling power and the blind obedience of the subjects. Most of the other orders soon adopted the same constitution. Accordingly at the head of every religious order stands a general or governor, who is chosen every three years from the officers of the institution, resides at Rome, and is responsible only to the pope. The counsellors of the general are the officers to whom the supervision and government of monasteries is committed. See *Monastery*, and the articles on the various orders.

Orders in Council, in British politics, orders issued by the sovereign, by and with the advice of the privy-council. See *Privy-council.*

Orders of Architecture, the chief styles or varieties exhibited in the architecture of the Greeks and Romans. Technically the chief feature of the order is the column—including base, shaft and capital—and its superincumbent entablature (consisting of architrave, frieze, and cornice). The character of the order, however, is displayed not only in its column, but in its general forms and detail, of which the column is, as it were, the regulator. There are five classic orders, namely Grecian: Doric, Ionic, and Corinthian; Roman: Tuscan, and Roman or Composite. See *Architecture, Column,* and the articles on the various orders.

Orders of Knighthood. See *Knighthood.*

Ordinal, the prescribed form of service used at the ordination of clergy, as in the English, Roman Catholic, and Eastern churches. The ordinal of the English Church was originally drawn up in the time of Edward VI. It was altered to some extent in the reign of Queen Elizabeth, and again revised in 1661.

Ordinary, in common law, one who has ordinary or immediate jurisdiction, in matters ecclesiastical, in any place. The term is more frequently applied to the bishop of a diocese, who, of course, has the ordinary ecclesiastical jurisdiction. An archbishop is the ordinary of the whole province, having power to visit and receive appeals from inferior jurisdictions. As a nautical term an *ordinary* seaman is one not qualified to take the helm or sail the ship, and is thus distinguished from an *able* seaman.

Ordinate, in analytical geometry, one of the lines or elements of reference which determine the position of a point. See *Co-ordinates.*

Ordination, the initiating of a Christian minister or priest into his office. The English Church considers ordination as a real consecration; the high-church party maintaining the dogma of the regular transmission of the episcopal office from the apostles down to the bishops of the present day. For ordination in the English Church, subscription to the thirty-nine articles is requisite. The ceremony of ordination is performed by the bishop by the imposition of hands on the person to be ordained. In most Protestant countries with a state church, ordination is a requisite to preaching; but in some sects it is not held necessary. In the Presbyterian and Congregational churches ordination means the act of settling a licensed preacher over a congregation, or conferring on him general powers to officiate wherever he may be called.

Ordnance. See *Cannon, Artillery, Howitzer, Mortar, &c.*

Ordnance Department, the department of the British government which for over

400 years provided the army and navy with arms, guns, and ammunition, administered the affairs of the artillery and engineer regiments, executed fortifications and other works at home and abroad, and supplied all troops at home with forage. It was abolished during the Crimean war (25th May, 1855), and its functions divided between the war office and the Horse Guards. In the United States the Department of Ordnance is attached to the War Department, and has a Chief of Ordnance, with a large force of officers and clerks at an annual cost in salaries of $175,000.

Ordnance Survey is the term applied to that system of observations conducted by the British government with a view to the construction of accurate and detailed maps of the country. The first such survey was made in Scotland, under the direction of Lieutenant-general Watson and Major-general Roy, and completed in 1755, but never published. In 1763 a proposal was made to have a survey taken of the whole of the kingdom; but it was not till 1784 that steps were taken to give effect to the proposal. In April, 1784, a survey was made by General Roy, R.E., under the auspices of the king and of the Royal Society, for the purpose of ascertaining by trigonometrical measurement the difference of longitude between the observatories of Greenwich and Paris. Soon after this the government decided on having a general trigonometrical survey made of the entire kingdom, on the scale of 1 inch to the mile, for military purposes; and General Roy's triangulation in the south-eastern counties became the basis of the great triangulation, which was gradually extended over the whole of the British Isles, and completed in 1852. Ireland and a few English and Scottish counties were surveyed on the 6-inch scale, and in 1863 the British government finally decided on the following scales: for towns having 4000 or more inhabitants, $\frac{1}{500}$th of the linear measurement, equivalent to 126·72 inches to a mile; for parishes (in cultivated districts), $\frac{1}{2500}$th, equal to 25·344 inches; for counties, 6 inches to a mile; for the kingdom, a general map, 1 inch to a mile. For London and environs the scale of 60 inches to a mile has been selected. In 1882 the survey of Great Britain and Ireland may be said to have been completed on the plan originally contemplated; the work now in progress being the resurvey on the 25-inch scale of that portion of England which had previously been published on the 1-inch scale, and the revision of the 6-inch map of Ireland. The whole of Scotland has now been published on the 6-inch scale. Extra surveys on specially large scales are in progress in some parts. The Ordnance Survey Office is a government department with its chief office at Southampton. The director-general and his chief assistants are senior officers of the Royal Engineers; but many civilians are also attached to this service.

Ordonnances was the name given in France to decrees, edicts, declarations, regulations, &c., issued by the king or regent.

Ore, the compound of a metal and some other substance, as oxygen, sulphur, or carbon (forming oxides, sulphides, carbonates, &c.), by which its distinctive properties are disguised or lost. Metals found free from such combination and exhibiting their natural character are called *native*. Metals are commonly obtained from their ores by smelting, the ores having been previously oxidized by *roasting*. Ores are commonly found in veins or lodes. See *Mining*, and the articles on the different metals.

Oreads, nymphs of the mountains in Greek and Roman mythology.

Örebro (*eu're-bru*), a town of Sweden, capital of the län or division of same name, at the western extremity of the Hjelmar Lake, 110 miles west of Stockholm. It is well built, has an old royal castle, &c., and a considerable trade with Stockholm by the Hjelmar and Maelar lakes and the Arboga Canal. It was once the residence of Gustavus Vasa and of Charles IX. Pop. 1892, 14,674.

Or'egon, one of the United States, on the Pacific coast, having on the north the Columbia River; east, the territory of Idaho; south, Nevada and California; and west, the North Pacific Ocean; area, 96,030 sq. miles. The 300 miles of coast-line are generally rugged and precipitous, and offer but few harbours. The interior consists of wide and elevated plateaux, rich in pastures and pine forests. Two great ranges divide the whole territory into three distinct portions. The first of these portions stretches north and south along the Pacific, and east from it for a width of 100 miles to 150 miles; and is then hemmed in by a lofty mountain-chain, which is called the Cascade Range, and occupies the whole breadth of the territory from S.S.W. to N.N.E. The other two portions, much more irregular in shape, are formed by a range which, under the names of the Blue Mountains and the Klamath,

finally bends round to the south-west, and becomes linked to the Cascade Range. Though the quantity of arable land is comparatively small, the pastures are large and rich; the forests abound with pines of almost unrivalled magnificence, and the metalliferous fields which have made California so famous are traced into Oregon. The value of gold and silver produced during 1897 was $1,354,593 and $109,963, respectively, an increase over 1896. The largest rivers are the Columbia and the Snake River; the principal ports, Portland and Astoria. The chief exports are grain and flour, wool, dead-meat, hides, fish, &c. The railways have a length of 1414 miles. The capital is Salem, quite a small place; Portland is the chief town in the state. In 1832 the first settlers from the U. States arrived in Oregon. In 1848 it was declared a territory of the U. States, and in 1859 it was admitted as a State. The pop. in 1870 was 90,922; in 1880, 174,768; in 1890, 313,767.

Orel (Russian pron. år-yol'), a central government of Russia, south of the Tula and Kaluga; area, 18,042 sq. miles. Its surface, though flat, is elevated, and the soil raises grain and hemp in abundance, and some good hops and tobacco. Live-stock, particularly horses, are extensively reared from improved breeds. Manufactures are chiefly confined to the distillation of spirits. The principal rivers are the Oka, the Desna, and the Sosna. Orel, or Orlov, the capital, on the Oka, is an important business centre, the river and canals giving it water communication with the Black Sea, the Caspian, and the Baltic. Its trade in grain, dairy produce, and cattle with Moscow and St. Petersburg is very extensive. Manufactures are also increasing, and the town is making rapid progress. Pop. 78,091. Pop. of government, 1,963,706.

Orellana (o-rel-yä'nà), Francisco, a Spanish companion of Pizarro, the first who traced the course of the river Amazon, which sometimes received his name.

Orel'li, John Caspar, a distinguished Swiss philologist and critic, born at Zürich in 1787, died 1849. In 1806 he was ordained to the pastorate of the Reformed Church at Bergamo in Italy. From 1813 to 1819 he held a professorship at the college of Coire, when he took the chair of eloquence and hermeneutics at the Carolinum, in Zürich, and in 1833, in addition, the chair of philology at the newly-founded university of Zürich. His reputation rests principally on his editions of the Greek and Roman classics (especially Horace), which have attained a well-merited celebrity.

O'renburg, a government of Eastern Russia, partly in Europe and partly in Asia, with an area of 73,816 sq. miles; pop. 1,244,778. A very large part of the surface consists of steppes, but the agricultural districts in the north-west supply large quantities of grain for export. The drainage is partly to the Arctic Ocean, partly to the Caspian, the chief rivers being the Tobol and the Ural. Gold abounds along the whole Ural chain, and there are also copper, iron, and salt mines. The population consists chiefly of the Finnish Votiaks and Tepyaks, and the Tartar Bashkirs, a large section being Mohammedans. The capital, Orenburg, on a slope above the right bank of the Ural, has, besides vast tallow-melting establishments, woollen, soap, and leather factories, and a large caravan trade with Khiva and Bokhara. Pop. 56,371.

Oren'se, a city of N. W. Spain, Galicia, capital of the province of same name, and see of a bishop, on the left bank of the Minho, here crossed by an old and remarkable bridge, built in 1230. It is a very ancient place, and has an interesting old Gothic cathedral and three warm springs (154° Fahr.). It has no commercial importance. Pop. 12,586.—The province has an area of 2739 square miles, and a population of 397,258. It raises a good deal of maize, and has mines of tin, copper, and iron.

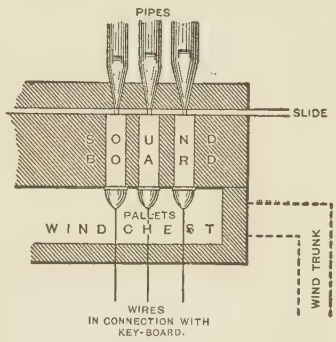
Ores'tes, in Greek mythology, the son of Agamemnon and of Clytemnestra, the avenger of his father, by becoming the murderer of his mother. For this murder he is relentlessly pursued by the Eumenides or Furies, and only succeeds in appeasing these terrible goddesses by carrying out the instructions of the Delphian oracle to bring back the statue of Diana from Tauris to Argos. Married to Hermione, daughter of Menelaus, Orestes ruled over his paternal kingdom of Mycenæ, and over Argos, upon the death of its king. Orestes is an important figure in the Choëphori and the Eumenides of Æschylus, the Electra of Sophocles, and the Orestes and Iphigenia in Tauris of Euripides.

Orfi'la, Matthew Joseph Bonaventure, a Parisian physician and chemist, born in 1787, at Mahon, in the island of Minorca; died at Paris 1853. After taking his degree of M.D. in Paris, he delivered lectures on botany, chemistry, and anatomy, which,

along with his medical practice, soon gave him a high reputation and a prominent position. Having been naturalized in France in 1818, he was next year appointed professor of medicine and toxicology at Paris, and in 1823 became professor of medical chemistry and medical jurisprudence. Louis XVIII. appointed him his body physician, and Louis Philippe bestowed further honours on him. He wrote several important works on toxicology and medical jurisprudence; his Leçons de Médecine Légale and his Traité de Toxicologie, were translated into most of the languages of Europe.

Orford, Earl of. See *Walpole.*

Organ (Greek *orgănon,* an instrument), a wind-instrument of music, the grandest of musical instruments, the introduction of which into the church service has undoubtedly exercised a powerful influence on the development of musical art. It is stated to be of very ancient origin, but is most probably the offspring of the *hydraulicon* or *water organ* of the Greeks. The early organs were very imperfect instruments, but improvements were naturally made from time to time, the most notable being those of the 16th century, when the bellows were much improved and the division of all the pipes into different stops invented, and the tone of the instrument adapted to the choir. The invention of the *wind-chest* in the 17th century, by which an equal pressure of wind can be obtained from all the bellows, led chiefly to the present perfect state of the organ. The three essentials of an organ are: (1) a chest of compressed air; (2) a set of pipes producing musical sounds in communication with this chest; and (3) a key-board or clavier, by means of which this communication may be opened or closed at pleasure. The air is forced into the wind-chest by means of bellows. To the upper part of each wind-chest is attached a *sound-board,* a contrivance for conveying the wind to any particular pipe or pipes at pleasure, and divided into as many grooves as there are keys. Air is admitted into these grooves by means of valves or pallets, which are connected with the keys; the transmission of air being regulated by the *register* or *slide.* The series of pipes above each slider is called a stop. The principal stops of an organ are the *open, stopped,* and *double* diapasons; the *principal, dulciana, twelfth, fifteenth, flute, trumpet, clarion, bassoon, cremona, oboe,* and *vox humana.* An organ may have several wind-chests filled by the same bellows, and several key-boards, each key-board and wind-chest representing a distinct organ. In the largest instruments the number of these organs generally amounts to five; viz. the *great organ,* the *choir organ,* the *swell organ,* the *solo organ,*



Organ—Internal Arrangements.

and the *pedal organ.* The key-boards for the hand are termed *manuals,* that for the feet the *pedal.* The most usual compass of the manuals is from CC to F in alt, four octaves and a half; that of the pedal from CCC to E or F, two and a quarter to two and a half octaves. There are two kinds of organ-pipes—*flute* pipes or *mouth* pipes, and *reed* pipes, of each of which there are several species, the character and quality of their sound depending mainly on the material employed in their manufacture (wood or metal), their shape, and dimensions. A hydraulic engine has been adapted, with success, to the purposes of working the bellows, and it is now pretty generally adopted. In 1863 a contrivance was patented for transferring some of the work from mechanism to electro-magnetism. An organ built on this principle is termed an *electric organ.* The principal advantages of this description of organ are that it facilitates the playing, and enables the organist to sit at a key-board at a distance from the instrument. Among the largest organs are those in St. Peter's in Rome, of the Seville Cathedral, of Weingarten in Suabia, of Haarlem, and of Notre Dame, Paris. The largest organ ever constructed is that built in 1870 for the Royal Albert Hall, London. There are five rows of keys for the choir, great, swell, solo, and pedal organs; 138 stops, and nearly 10,000 pipes. The bellows are inflated by steam power.

A free-reed instrument was introduced about 1860 by Mason and Hamlin of New York, known as the *American organ*, differing from the harmonium in having smaller and more curved reeds and in drawing the air inwards. It is more easily blown than the harmonium, and its tones are of a more organ-like quality, but it is inferior to the latter instrument in variety of tone and power of expression.

Organ, ORGANIZATION. In biology, the term *organ* is applied to all the definite parts with special functions, forming as a whole the structure of a living body, whether animal or vegetable. The dissimilarity between the organs of which a living being is composed forms a very striking contrast to the structure of lifeless bodies. A lifeless body—such as a mineral—exhibits generally a sameness or homogeneity of structure. Its intimate parts or particles are usually of a similar kind or nature. Hence this broad and patent distinction has resulted in the employment of the terms *organic* and *organized* to express the characteristics of living beings; whilst to the lifeless part of creation the opposing term *inorganic* is applied. *Organization* thus means the possession of definite organs, structures, or parts, which have definite relations to each other; and an *organism* is a whole, an animal or plant, possessing such organs.

Organic Radicals, in chemistry, the name given to a number of compounds of carbon which act in many bodies as if they were truly elementary substances.

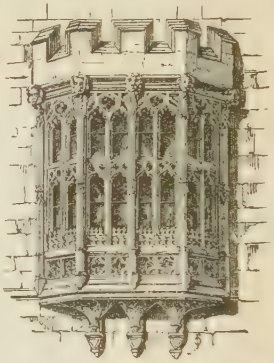
Or'ganzine, a silk thread of several singles twisted together; thrown silk. See *Silk*.

Orgeat (or'zhat), a liquor or syrup extracted from barley (French, *orge*) and sweet almonds, used to mix with certain drinks or medicinally as a demulcent.

Orgies (Greek, *orgia*), anciently the mystic rites and wild revels celebrated in honour of Bacchus; also the festivals and mysteries of other Pagan deities. See *Bacchus* and *Mysteries*.

Oriel College, Oxford, a college founded in 1326 by Edward II. on the suggestion of Adam de Brome, his almoner, for a provost and ten fellows. St. Mary's Hall, founded 1325, has recently been united with Oriel College.

Oriel Window, a window projecting from the outer face of a wall, in plan semi-hexagonal, semi-octagonal, or rectangular, thus having three or more sides, divided by mullions and transoms into different bays and other projections, and supported by brackets or corbels. A projecting window rising



Oriel Window, Balliol College, Oxford.

from the ground is sometimes called an oriel, but is more properly a bay-window.

Oriental, eastern. The term is often applied to certain gems or precious stones as a mark of excellence, or to distinguish them from an inferior variety, in opposition to *occidental*.

Oriental Languages, the general designation at the present day for the languages of the nations of Asia, as also of the Mohammedan countries of Europe and Africa.

Orientation, a turning towards the east; the direction of something towards the east. By ecclesiologists it is used in regard to the building of churches in a direction east and west, though often a deviation from the true east has been observed to exist in churches which had been supposed to stand for exactly east and west.

Oriflamme, until Charles VII.'s reign, the royal standard of France, originally the banner of the abbey of St. Denis and its lord protector. When the French kings chose St. Denis as their patron saint, they made the oriflamme the principal banner of their armies. It was a piece of red taffeta fixed on a golden spear, in the form of a banner, and cut into three points, each of which was adorned with a tassel of green silk.

Origen (or'i-jen), ORIGINES, surnamed *Adamantios*, one of the greatest and most influential of the Greek fathers, born at Alexandria A.D. 185, died at Tyre 254. His father suffered martyrdom at Alexandria in 202 under the Emperor Severus, when Origen undertook the support of his mother

and six children. He lectured with much success in Alexandria, and gained the patronage of Bishop Demetrius. His own studies were pursued with extraordinary zeal; he lived an ascetic life, and in order to be free from the lusts of the flesh he mutilated himself. A journey to Rome (211–212) greatly increased his reputation, and Christian communities in various countries vied with each other in securing his services. In 228 he went to Palestine; he was so well received, and so many favours were bestowed on him, that his patron became jealous, recalled him to Alexandria, and finally deprived him of his priestly office, charged him with heresy, and expelled him from the city. These persecutions never ceased until the death of Demetrius in 231. In a new persecution, under the Emperor Decius, Origen, who was viewed as a pillar of the church, was thrown into prison, and subjected to the most cruel sufferings, ultimately resulting in his death. He has been reproached with having attempted to blend the Christian doctrines with the notions of Plato, and, without reason, of favouring materialism. He is credited with some 6000 works, including smaller tracts, but only a few have been transmitted to us, and some of these only in a distorted form. His work against Celsus is considered as the most complete and convincing defence of Christianity of which antiquity can boast. One of his works was the Hexapla (which see), but of it we have only fragments. A translation of his extant works into English has been published (Edinburgh, 1868–72).

Origenists, Christian heretics in the 4th century, so called because they pretended to draw their opinions from the platonic notions in the writings of Origen. They first made their appearance in Italy in 397, with Rufinus of Aquileia as their teacher.

Original Sin, in theology, the first sin of Adam, namely, the eating of the forbidden fruit; hence, either the imputation of Adam's sin to his posterity, or that corruption of nature and tendency to sin inherited from him. The Greek fathers held that a perverted will and sin are co-ordinate with the human race, and that death has dominion over it by reason of its origination from Adam after the fall. In the Latin Church the doctrine was more fully developed than in the Greek Church. Tertullian, in accordance with his doctrine of Traducianism, which holds that the soul as well as the body is generated by the parents, asserted that sin and death were alike propagated from Adam; he accordingly held an *originis vitium*, but without regarding it as actual sin or denying to man the possibility of goodness. Pelagius held that no change whatever had been brought about by the fall, that death was a part of man's original constitution, and that all men could render faultless obedience to the law of God, if they wished. Augustine succeeded in getting this doctrine condemned in favour of his own, which inculcated that 'Death was brought into the world by Adam's sin; man's free-will, the reflex of the divine will, was lost to him by the fall as regards good; there remained only spontaneity, the negation of outward constraint, and free-will as regards evil.' Pelagianism, however, sprung up again in a modified form, called semi-Pelagianism, and according to this view death and a taint of corruption were inherited from Adam as a disease might be, but man still retained a power for good without the aid of divine grace; a doctrine which obtained much support in the church. The reformers of the 16th century upheld the Augustinian view of original sin, though by no means unanimously, in opposition to the Roman Catholics, who at the Council of Trent gave their adhesion to the semi-Pelagian view of the doctrine. In recent times orthodox theologians, such as Olshausen, Hengstenberg, and others, have stood up for the Augustinian doctrine, while those of the more liberal school have modified it in various ways. Philosophers as well as theologians have taken part in this controversy about original sin.

Origin of Species. See *Species*.

Orihuela (ō-rē-wā'là), an ancient town of S.E. Spain, prov. Alicante, in a fertile plain on the Segura, 30 miles south-west of Alicante. The principal buildings are the cathedral and an episcopal palace. It has a considerable trade in fruit, cereals, oil, and wine. Pop. 20,929.

Orino'co, a river of South America, one of the largest in the world, rising in the Sierra del Parima, near lat. 3° 40′ N., lon. 64° W., and after a circuitous course falling into the Atlantic opposite Trinidad; its principal mouth being 6 leagues wide; length about 1500 miles. The Orinoco is connected with the Rio Negro, a tributary of the Amazon, by the Cassiquiari, a natural canal joining the two rivers, and it receives the waters of many large rivers. During the rainy season it inundates the immense plains

through which it flows, presenting to the eye a boundless expanse of waters. The scenery on its banks is magnificent beyond description. Two remarkable rapids occur in the upper part of the Orinoco, and from these the river is navigable to its mouth (about 780 miles).

O'riole, a name popularly applied to two groups of birds, the one group included in the Conirostral section of the Insessores or perching birds, the other classified with the Dentirostral section. The American Orioles belonging to the former group are nearly allied to the starlings. The Baltimore-bird (which see), oriole, or golden robin (*Ictĕrus* or *Hyphantes Baltimore*), is a familiar species of this group. Another, the orchard oriole (*Ictĕrus spurius*), is distributed very generally over the United States. The orioles proper, or those of the Old World, are nearly related to the thrushes. They are found in Asia, Africa, the islands of the Indian Archipelago, and Southern and Eastern Europe. The golden oriole (*Oriŏlus Galbŭla*) is the typical form, and the only European member of the group. The wings and tail of the males are black, and contrast powerfully with the golden colour of the body. In size it resembles a common thrush or blackbird. It chiefly inhabits Southern Europe, but is occasionally found in Britain. The song is loud, and resembles the sound of the flute.

Ori'on, a hero of Greek mythology. According to Homer he was a beautiful youth, of whose charms Eōs (Aurora) became enamoured. The gods were jealous of her love, and Artemis slew him with her arrows. According to other writers he was a great hunter of colossal stature, and died of the sting of a scorpion. The hero after his death was placed with his hounds in the heavens as a constellation, which bears his name.

Ori'on, a constellation situated in the southern hemisphere with respect to the ecliptic, but the equinoctial passes nearly across its middle. This constellation is represented by the figure of a man with a sword by his side. It contains seven stars, which are very conspicuous to the naked eye; four of these form a square, and the three others are situated in the middle of it in a straight line, forming what is called the *Belt of Orion*, and popularly the *Ell-wand* or *Yard-wand*. Orion also contains a remarkable nebula, and eighty stars according to the British catalogue, but there are thousands of others which are only visible through powerful telescopes.

Oris'sa, a maritime province of Hindustan, lying on the Bay of Bengal, between Bardwan and the Madras Presidency, forming a division or commissionership under the jurisdiction of the Lieut.-governor of Bengal. It has an area of 9053 square miles, and includes the three districts of Balasore, Cattack, and Puri, and a number of tributary states. The surface along the shore is in general low and sandy, and in the interior wild and rugged. The inhabitants are composed chiefly of Oorias, the conquerors of the country; and of wild hill tribes. The largest river is the Mahánadi. The chief towns are Cattack, Puri or Juggernauth, and Balasore. Pop. 3,370,735.

Orista'no, a city of the island of Sardinia, on the west coast, the seat of an archbishop. Pop. 6953.

Oriza'ba, a town of Mexico, state Vera Cruz, 65 miles W.S.W. of Vera Cruz, and on line of railway connecting the latter city with Mexico. It lies in a fertile valley, 3975 feet above sea-level, and is a rapidly-improving trade centre. Tobacco, grown in the neighbourhood, is extensively manufactured, also leather and woollen cloths. In its vicinity is the extinct volcano, the Pico de Orizaba 17,665 feet high. Pop. about 20,000.

Orkney Islands (the ancient *Orcădes*), a group lying off the northern coast of Scotland, and separated from it by a channel called the Pentland Firth, about 6 to 8 miles broad; aggregate area, 375 square miles. There are 67 islands and islets, 28 of which are inhabited. Pomona or Mainland is the largest of the group; others of considerable size are: Hoy, South and North Ronaldshay, Westray, Sanday, Eday, Stronsay, Rousay, and Shapinshay. Excepting Hoy, none of the islands have hills of any height; there are no large streams, but many lakes and springs. Trees scarcely exist. The rocks belong to the Old Red Sandstone formation, and clay and peat-moss abound. The climate is moist but not cold, being remarkably mild in winter. Agriculture, pasturing, and fishing are the supports of the inhabitants, manufactures being restricted to hosiery, chiefly hand-made by women. The fisheries are vigorously prosecuted. Agriculture is not in a flourishing condition, and the crofters of the islands were included in the Crofters' Act of 1886. The chief town is Kirkwall. It is probable that the Picts originally possessed the islands, but in the 8th century and subse-

quently they were occupied by the Northmen. In the 9th century Harold Haarfager attached them to Norway, and for several centuries they were ruled by jarls or earls, who sometimes owned allegiance to Norway, sometimes to Scotland. About the middle of the 13th century they were transferred to Alexander, king of Scotland; but the Norwegians continued to assert their sovereignty. James III. of Scotland received the islands as a dowry with Margaret of Norway in 1469, and ever since they have belonged to Scotland. The Orkney and Shetland Islands form together one county (for parliamentary purposes at least), and return one member to the House of Commons. Pop. 1891, 30,438.

Orlando Furioso. See *Ariosto.*

Orlando Innamorato. See *Boiardo.*

Orléanais (or-lā-à-nā), a former province of France, now forms the departments Loir-et-Cher and Loiret, and parts of Eure-et-Loir, Nièvre, Seine-et-Oise, Sarthe, Indre-et-Loire, and Cher.

Orléans (or-lā-ăn), a city of France, formerly capital of Orléanais, now of the department of the Loiret, situated on the right bank of the Loire, 68 miles south-west of Paris. It has some handsome public squares, a Gothic cathedral, two hôtels-de-ville, a palais de justice, and other notable buildings. The manufactures and trade of the place have much declined; confectionery, pottery, and woollen goods are the staple articles of manufacture. Philip of Valois erected Orléans into a duchy and peerage in favour of his son, and Orléans has since continued to give the title of duke to a prince of the blood-royal. In 1428 the city sustained a siege against the English, and was relieved by the Maid of Orléans (see *Joan of Arc*), whose statue in bronze stands in one of the public squares. It was taken and retaken more than once in the Franco-German war in the latter part of 1870. Pop. 1891, 63,705.

Orléans, a French royal family, two houses of which have occupied the throne of France. (1) On the death of Charles VIII. without issue in 1498, Louis, duke of Orléans, great-grandson of their common ancestor Charles V., and grandson of the first Duke of Orleans, being the nearest heir, ascended the throne under the title of Louis XII. Henry III. (died 1589) was the last sovereign of this house, or the *Valois-Orléans* branch. (2) The house of *Bourbon-Orléans* is descended from Philip, duke of Orléans, son of Louis XIII. and younger brother of Louis XIV. His son Philip, duke of Orléans, was regent of France during the minority of Louis XV. His grandson Louis-Philippe Joseph, who assumed the surname of *Égalité*, was beheaded in 1793. (See article below.) Louis Philippe, duke of Chartres, afterwards king of the French, was the son of *Égalité.* The grandson of Louis-Philippe, the Comte de Paris, born 1838, and educated in England, is now the head of the royal house and royalist party of France. See *Bourbon* and *Paris, Comte de.*

Orléans, Jean Baptiste Gaston, Duke of, third son of Henry IV. of France, and Mary of Medici, born 1608, died at Blois 1660. His early education was miserable, and the cause of the feebleness of character which he displayed through life, although he had received from nature much more of his father's spirit than his brother Louis XIII. The latter was jealous of the duke, and opposed him in many ways, while the duke retaliated by intriguing against the king; and but for Richelieu, who was a greater power in the state than the royal family itself, might have succeeded. By his first marriage, with Mary of Bourbon, heiress of the house of Montpensier, he had a daughter, the author of some interesting memoirs. During the disturbances of the Fronde he joined De Retz, the soul of the Fronde, who, however, soon saw through the character of his fickle and feeble confederate. After the termination of the troubles (1648) the duke was banished to Blois.

Orléans, Louis Philippe Joseph, Duke of (*Égalité*), great-grandson of the regent, Philippe, duke of Orléans, was born in 1747; married in 1769 the daughter of the Duke of Penthièvre. He was notorious for his dissoluteness of manners, and the extreme, though vacillating political conduct by which he courted popularity. His opposition to the court began in 1771, and he became the rallying point of its enemies. In 1787 he was exiled for the part he took in the Assembly of Notables; in 1789 he was one of the nobles who joined the Tiers État (Third Estate); in 1792 he went over to the revolutionary party without reserve, took the name of *Philippe Égalité* ('Philip Equality'), and voted for the death of Louis XVI. It did not save him from being arrested as a Bourbon, condemned and beheaded, 6th November, 1793.

Orléans, Maid of. See *Joan of Arc.*

Orleans, New. See *New Orleans.*

Orléans, PHILIPPE, DUKE OF, only brother of Louis XIV. of France, and founder of the house of Bourbon-Orléans, which for a short time held the throne of France, was born in 1640, died 1701. In his twenty-first year he married Henrietta of England, sister of Charles II. The great esteem which the king showed for this princess excited the jealousy of his brother, and her sudden death was attributed to poison, to the administration of which the duke was suspected of being accessory. His jealousy seems not to have been unfounded. The second marriage of the duke, with the Princess Elizabeth of the Palatinate (1671), was arranged by Louis to secure the neutrality of the Elector Palatine in the approaching war against Holland. In this war the duke distinguished himself in spite of his effeminacy.

Orléans, PHILIPPE, DUKE OF, Regent of France, son of Philippe, duke of Orleans (see preceding article), and the Princess Palatine Elizabeth, born 1674, died 1723. He fell early under the influence of the clever and unscrupulous Abbé (afterwards Cardinal) Dubois, who continued his confidant and adviser through life. He made his military début at the siege of Mons (1691), and in 1693 distinguished himself at Neerwinden, but only to arouse the jealousy of Louis XIV., his uncle, who compelled him to retire from the army. In 1692 he married Mdlle. de Blois, the legitimated daughter of Louis. In 1707 he was appointed to succeed the Duke of Berwick in Spain, and completed the subjugation of that country. He was recalled, however, being suspected of intriguing for the crown of Spain, and again forced into retirement. On the death of the king (1st September, 1715) he was appointed regent. On acceding to power the regent found the finances in extreme disorder, and endeavoured to improve matters by retrenchment and peace; but his reckless introduction of a vast paper currency brought the nation to the verge of bankruptcy. He resigned the government to Louis XV. on 13th February, 1723.

Orloff, a Russian noble family, of whom the following members may be mentioned:—GREGORY ORLOFF, born 1734, died 1783, assisted the Grand-princess Catharine in the revolution, by which she was declared empress (Catharine II.), and her husband, the Emperor Peter III., deprived of life. Orloff soon attained the highest dignities and became enormously rich.—ALEXIS, his brother, born 1737, died 1808, is famous for his devotion to the empress, as one of the murderers of Peter III., and as the admiral who defeated the Turkish fleet off Tschesme.—ALEXIS FEDOROVITCH, prince, a descendant of the same family, born in 1787, died 1861. In 1825 he gained the favour of Nicholas I. by assisting to suppress the revolt of the guards on his accession. He held a cavalry command in the Turkish campaign of 1828, and assisted in suppressing the Polish insurrection in 1831; he also rendered successful diplomatic service, especially at Constantinople. In 1844 he was appointed chief of the gendarmes and secret police. He was the confidential friend of the emperor.

Orlop Deck, the lowest deck in a ship of several decks, consisting of a platform laid over the beams in the hold whereon the cables are usually coiled. In trading vessels it is often a temporary deck.

Ormer (Fr. *oreille de mer*, 'sea-ear'), the ear-shell, a large marine univalve shell-fish belonging to the genus *Haliōtis*, common on the shores of the Channel Islands, where it is cooked after being well beaten to make it tender. The shell is common as a mantelpiece ornament on account of its pearly interior.

Orme's Head, GREAT, a bold projecting headland, in North Wales, at the mouth of the river Conway, surrounded nearly on all sides by the sea.

Or'molu (French, *or moulu*, literally 'ground gold') is in English frequently applied to a metal compounded of copper and zinc (mosaic gold), nearly resembling brass, but having a colour more like that of gold. In French *or moulu* signifies a paste of gold and mercury used for gilding, and the colour imparted to a surface by that paste.

Ormonde, DUKE OF. See *Butler, James*.

Ormskirk, a town of England, in Lancashire, 13 miles N.N.E. of Liverpool. Its chief occupations are brewing and rope-making. There are large collieries in the neighbourhood. Pop. 1891, 6298.

Ormuz, or HORMUZ, an island in the Persian Gulf, on the north side, near its entrance, about 15 miles in circumference. It is entirely destitute of vegetation, and is only noticeable as having once been a great trade centre. It was held by the Portuguese from 1515 to 1622. A few ruins are all that is left of its former wealth and splendour.

Ormuzd (*Ahuramazda*, the Oromasdes of the Greeks and Romans), the name of the supreme deity of the ancient Persians. According to the doctrine of Zoroaster he was

the lord of the universe and the creator of earthly and spiritual life, the source of light, wisdom, and intellect, and the giver of all good. He rewards the good and punishes the wicked. See *Zoroaster*.

Orne, a department in Normandy, France; area, 2354 square miles. It receives its name from the river Orne which rises in this department, and passing through that of Calvados falls into the English Channel (length, 95 miles). The surface is traversed by a lofty ridge, mostly covered with forests. The soil is various; oats, flax, hemp, beet, fruits, and cheese are the chief produce, and a good breed of Norman horses is reared. It manufactures needles, pins, wire, porcelain, cotton and linen cloths, and has valuable granite quarries. Alençon is the capital. Pop. 1891, 354,387.

Ornithodel'phia, the name given to the sub-class of mammals represented by the single order Monotremata, including only two species, the ornithorhynchus and echidna.

Ornithol'ogy (Greek, *ornis, ornīthos*, a bird, *logos*, discourse), that branch of zoology which treats of birds. Birds (Aves) form the second class of the great division of vertebrate animals, the connecting link between the Mammalia and Reptilia, but are more closely allied to the latter. In common with the Mammalia they have warm blood, though of a higher and uniform temperature (8°–12° higher), a heart with two auricles and two ventricles, and breathe by lungs; but differ from them in having feathers for a covering, two feet, wings, by means of which most of them are enabled to fly, a horny bill, and reproduction by eggs. The feathers, the development of which resembles essentially that of hair, constitute appendages of a unique kind, as being developed only in connection with the bird-class. The under-plumage of most birds is formed by a thick coating of small shaftless feathers, embedded in the skin and called *down*. Various names are given to feathers according to their position; thus the long quills on the part of the wing corresponding to the hand are called *primaries*, those on the lower fore-arm *secondaries*, and those on the upper part of the fore-arm *tertiaries*, those on the shoulder-blade and humerus *scapulars*. The feathers covering the bases of the wing-quills are called *wing-coverts*, and those covering the *rectrices*, or great feathers of the tail, *tail-coverts*. Birds moult or renew their feathers periodically, and in many cases the winter plumage displays a different colouring from the summer plumage. The plumage in most cases is

Plumage of Bird—Bohemian Chatterer (*Bombycilla garrula*).

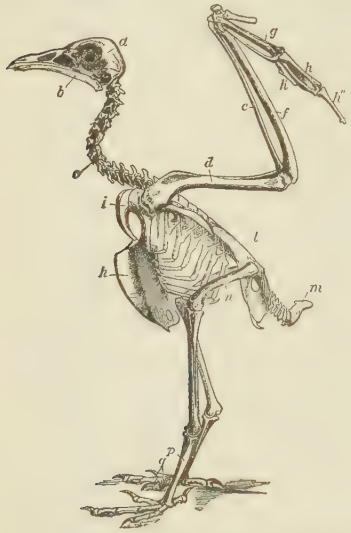
a, primaries; *b*, secondaries; *c*, coverts; *d*, scapulars; *e*, tail feathers; *f*, forehead; *g*, sinciput; *h*, occiput.

changed frequently before it attains its characteristic and full-grown state.

The mouth of birds takes the form of a beak or bill; the jaws or *mandibles* are hard and horny, and more or less prolonged into a point, while there are no fleshy lips and no teeth (except in certain fossil birds); a horny sheathing, generally smooth, but sometimes serrated, takes the place of the latter. The beak is variously modified in accordance with the habits of the bird and the nature of the food on which it subsists. The sense of taste is not keen, their tongue being generally slender, pointed, and more or less horny, though some birds, as the parrots, have it fleshy. The nostrils open upon the side, or at the base of the beak. Their sense of smell is often very delicate. A circle of naked skin called the *cere* in many birds surrounds the base of the mandibles. The sight of birds is extremely keen, and equally adapted for near and for distant objects. A peculiar feature in the eye is the *nictitating membrane*, a sort of third translucent eyelid which rests in the inner angle of the eye, but can be drawn over it so as to protect it from too strong a light. Birds have no external ear, with the exception of the nocturnal tribes; these have a large exterior *conch* in the form of a thin leathery piece of flesh. The internal ear is very large, and the sense of hearing very quick.

The bone-tissue of birds is light and compact. The bones are whiter and contain a larger proportion of phosphate of lime than

those of the Mammalia and lower vertebrates. The bones of most birds are *pneumatic*, that is, contain air instead of marrow, to adapt them for flight; the air being admitted by means of special apertures which are connected with certain sacs, termed *air-cells*, filled with air from the lungs. In many birds, however, the long bones are



Skeleton of Egyptian Vulture (*Neophron percnopterus*), to show bones of bird.

a, post-orbital process; *b*, lower jaw; *c*, cervical vertebræ; *co*, coracoid bone; *d*, humerus; *e*, radius; *f*, ulna; *g*, metacarpus; *h*, second phalanx of chief digit of wing; *h'*, phalanges of lower digit; *h''*, first phalanx of chief digit; *i*, clavicle; *k*, sternum; *l*, pelvis; *m*, coccyx; *n*, femur; *o*, tibia; *p*, tarso-metatarsus; *q*, phalanges of foot.

filled with marrow, as are also all the bones of young birds. The humeri, cranial bones, and sternum are most generally pneumatic, the femora more rarely so. The vertebræ vary considerably in number in different species. The neck is always more or less elongated and flexible, and consists of from 9 to 23 vertebræ. The dorsal region, or region of the back, is composed of from 4 to 9 vertebræ, and is generally firm, forming a support for the movements of the wings. In all birds the neck is of sufficient length to reach the *oil-gland* situated at the tail, the secretion of which is used for 'preening' or dressing the feathers. The vertebræ interposed between the dorsal vertebræ and those of the tail are united to form the sacrum, the number of vertebræ which may thus coalesce varying from 9 to 20. The caudal or tail vertebræ may number ten, the last two or more of which unite to form a bone, called from its shape 'ploughshare' bone. In some species this bone is absent, undeveloped, or modified. The bones of the skull become firmly united at an early period, so as to leave few or no sutures or lines of union, as in mammals, a complete bony case being thus formed. The skull is joined, as in reptiles, to the spinal column by a single process, or condyle, of the occipital bone, or hindermost bone of the skull. The chest or thorax is inclosed posteriorly by the dorsal vertebræ, laterally by the ribs, and in front by the sternum or breast-bone and the sternal ribs. The ribs correspond in number with the dorsal vertebræ, from 6 to 9 pairs of ribs being thus found in birds, the first two being generally unattached, that is, they do not reach the sternum in front. The sternum is large and strong, and serves as the point of attachment for the most powerful of the muscles by which the wings are set in motion. It is provided with a medial crest or *keel*, which is most prominent in the birds of most powerful flight, and is altogether absent in the ostrich and cassowary, birds which do not fly. Upon the upper or anterior portion of the sternum the *coracoid bones* are borne, which form the chief supports of the fore-limbs. At its upper portion each coracoid bone articulates with the scapula or shoulder-blade, and with one of the clavicles. The clavicles or collar-bones are united in most birds to form the *furculum* or merry-thought. The wing of the bird exhibits the essential skeletal elements found in the fore-limb of all other vertebrates. The humerus, or bone of the upper arm, is generally short; the forearm, composed of the radius and ulna, being the longest segment of the fore-limb. The ulna is larger and better developed than the radius, which is slender and attenuated. In the bones which form the extremity of the wing we recognize the rudiments of a thumb and two fingers, one of which has two phalanges and the other only one. The femur or thigh is short, the tibia or shin-bone forming the chief element in the leg; whilst the fibula is attenuated and generally ossified to the tibia. The toes generally number four; the hallux or great-toe, when present, being composed of two phalanges, and the other toes of three, four, and five phalanges respectively. The muscles of birds are firm

and dense, and are generally coloured deep-red. The chief body-muscles are the pectorals, or those of the breast, which are devoted to the movements of the wings.

There are three stomachs or stomachic dilatations in birds; the first is the *crop*, a considerable pouch attached to the *œsophagus* or *gullet;* then the *ventriculus succenturiatus*, a slight dilatation of the œsophagus, with thick and glandular walls; then immediately after this is the *gizzard*, a strong and muscular cavity. In granivorous birds the crop is large, and serves as a reservoir for the seeds swallowed by them, which are here moistened by a secretion before passin into the gizzard. In these birds the gizzard is extremely strong, having to perform the task of grinding down the hard substances subjected to its action, a process which is facilitated by the small stones which these birds generally swallow. The ventriculus secretes the gastric juice, and so far represents a real stomach. In birds which live on flesh or fish the gizzard is weaker and less distinct from the ventriculus; while the crop becomes smaller, and in some species completely disappears. The intestinal canal is relatively smaller than in Mammalia and presents fewer circumvolutions. It terminates in an opening called the *cloaca*, which is also the common termination of the ureters and oviduct. The liver is generally large, and coloured a distinct brownish hue, which is deepest in aquatic birds. A gall-bladder is absent in a few cases only, as in the ostrich, pigeons, and some parrots. The kidneys are two in number, of large size and elongated shape. The urine consists in greater part of earthy matters, and contains but a small proportion of water, hence its whitish appearance. The spleen is usually of small size, rounded or oval, but may also be elongated or broad and flattened. The heart is highly muscular, four-chambered; the blood, deep-red in colour, circulates rapidly and vigorously. The lungs are confined to the back portion of the body, and are attached to the ribs, instead of being free, as in Mammalia. They are not divided into lobes, and are usually of a bright-red colour. They are enveloped in a membrane pierced with large holes, which permit the air to pass into the cavities in the breast and in the abdomen, and, in some species, even into the interior of the bones. The trachea or windpipe is of great relative length in birds, and is adapted to the length of the neck. The nervous system evinces a marked superiority over that of reptiles. The cerebrum, or true brain, is larger than in the latter, but its surface is not convoluted, as in most Mammalia. The generative organs consist of the essential organs or testes of the male, accompanied in some cases by an intromittent organ. The female organs consist of an ovarium and oviduct. The eggs are hatched by the process of *incubation*. Very great differences exist in the size, form, and number of eggs which may be produced by birds, and in the time required for their hatching. The varieties of nests in which they are deposited, as to mode and materials used in construction, are endless.

Digestive System of Common Fowl.

a, gullet; *b*, proventriculus; *c*, gizzard; *d*, duodenum; *e*, cæcal appendages; *f*, large intestine; *g*, cloaca; *h*, small intestines; *i*, liver; *k*, crop.

Many birds migrate at certain seasons from one country to another, and a recent report on migration shows, that with very few exceptions there is scarcely a bird of either the palæarctic or nearctic regions that is not, to a greater or less degree, migratory in some part or other of its range. See *Migration*.

As for the classification of birds many systems have been proposed. A common division is into seven orders, to which an eighth, the *Saururœ* of Huxley, is often added, to include the extinct archæopteryx. These orders are:—

Order I.—Raptores or *Accipitres*. Birds of Prey, as eagles, vultures, hawks, and owls. Beak strong and curved, sharp at the edges. Feet adapted for seizing and destroying other animals. Claws sharp, much hooked, and retractile. Hind toe on the same level with the others. Wings well developed.

Order II. — Insessores, *Passeres*, or Perching Birds, by far the most numerous order. It includes all the singing birds, and indeed, excluding the birds of prey, most birds which live habitually among

trees. Feet formed for grasping and perching, claws moderately curved and not retractile. Hind toe on the same level as the rest. This order is usually divided into four *tribes* or sub-orders: *Conirostres* (cone-billed); *Dentirostres* (tooth-billed); *Tenuirostres* (slender-billed); *Fissirostres* (cleft-billed).

Order III. — Scansores or *Zygodactyli*. Climbing Birds, as the parrots, wood-peckers, cuckoos, toucans, &c. Feet formed for climbing, two of the toes directed forward and two backward; powers of flight not in general great; bill variously shaped.

Order IV.—Rasores or *Gallinæ*. Domestic Fowls, Pheasants, Pigeons, &c. Legs large and strong. Feet with the hind toe situated above the heel, suited for scratching. Bill short, thick, and arched above.

Order V. — Cursores or *Struthionidæ*. Running Birds, as the ostrich, emu, cassowary, &c. Wings rudimentary and quite useless for flight; legs long and strong; hind toe wanting or merely rudimentary; breast-bone without a ridge or keel.

Order VI.—Grallatores or *Grallæ*. Waders, as the cranes, herons, snipes, sandpipers, &c. Legs long, bare of feathers from above the knee; toes often half-webbed. Bill in general long and slender.

Order VII.—Natatores or *Palmipedes*. Swimmers: web-footed birds, as ducks, geese, gulls, &c. Feet formed for swimming, in general webbed, that is the toes connected by a membrane. Hind toe elevated above the plane of the others. Bill various, mostly flattened.

Mr. Sclater (partly following Huxley and others) has proposed a system of classification which has met with much acceptance, and is based partly on external, partly on internal features. Regarding the class Aves as divided into two sub-classes, *Carinātæ* and *Ratitæ*, the former containing all birds that have a prominent keel on the sternum (Lat. *carīna*), the latter having the sternum flat and raft-like (Lat. *ratis*, a raft), he divides the former into twenty-three and the latter into three orders, thus:

Carinatæ.—I. Passeres, with four sub-orders (including more than half of all known birds, and substantially corresponding with the older order Passeres or Insessores). II. Picariæ, with six sub-orders (woodpeckers, swifts, goat-suckers, trogons, toucans, cuckoos, &c.). III. Psitacci (parrots). IV. Striges (owls). V. Accipitres (eagles, hawks, vultures, and other diurnal birds of prey). VI. Steganopodes (pelican, cormorant, gannet, &c.). VII. Herodiones (herons, storks, bittern, &c.). VIII. Odontoglossæ (flamingoes). IX. Palamedeæ (screamers). X. Anseres (geese, ducks, swans). XI. Columbæ (pigeons). XII. Pterocletes (sand-grouse). XIII. Gallinæ (fowls, partridges, pheasants, grouse, &c.). XIV. Opisthocomi (includes only one bird, the Hoatzin). XV. Hemipodii (Hemipodes, a small group). XVI. Fulicariæ (rails, coots, &c.). XVII. Alectorides (cranes, bustards, trumpeter). XVIII. Limicolæ (snipe, woodcock, curlew, plover, &c.). XIX. Gaviæ (gulls). XX. Tubinares (petrels). XXI. Pygopodes (divers, auks, grebes). XXII. Impennes (penguins). XXIII. Crypturi (tinamous). Sub-class Ratitæ.—XXIV. Apteryges (apteryx). XXV. Casuarii (cassowary and emeu). XXVI. Struthiones (ostrich, rhea).

Birds are not numerous as fossil organisms. Among the most important and interesting bird fossils we at present possess are the two specimens of archæopteryx found in the slate-quarries of Solenhofen (Bavaria). This bird differed from all existing birds in the elongated reptilian nature of its tail, which was composed of simple vertebræ, each bearing a single pair of quill-feathers. It had also teeth. They certainly tend to prove the evolution of birds from reptiles. Other two most interesting fossil birds are the ichthyornis and the hesperornis, both found in the cretaceous formations of N. America and both provided with teeth; but while the former must have had powerful wings the latter was quite wingless.

Ornithorhynchus (*Ornithorhynchus paradoxus*), the duck-billed water-mole of Australia. With the echidna or porcupine ant-eater of Australia it forms the order Monotremata — the lowest division of the mammalian class. This curious animal was first described by Shaw in 1792, and caused no little excitement among zoologists. It presents a quadruped, of the shape and size of a small otter, covered with short brown fur; a horny flat bill like a duck; a short flat tail; short legs with five-toed and webbed feet, terminated by claws. The eyes are small; external ear wholly wanting. The skull is bird-like in conformation; brain without convolutions; coracoid bones as in birds well developed. Its young are produced from eggs, are born blind and hairless, and suckled from milk-glands destitute of nipples. It forms large burrows in river and lake

banks, rising from near the surface of the water to a height of perhaps twenty feet above it, the nest being at the higher end.

Ornithorhynchus or Water-mole (*Ornithorhynchus paradoxus*).

It swims for its food, which consists of insects, worms, larvæ, &c.

Orobanchaceæ (-ban-kā'si-ē), the broom-rape family of plants. Their general properties are astringency and bitterness. The calyx is divided, persistent, inferior; the corolla hypogynous, irregular, persistent, æstivation imbricated; stamens, four; ovary free, one-celled, with two carpels; style, one; stigma two-lobed, divided transversely to the carpels; fruit capsular. The Orobanchaceæ are herbaceous parasites, with scales in place of leaves, and attach themselves to the roots of different plants, as the *Orobanche major* to broom and furze, *O. ramōsa* to hemp, *O. rubra* to thyme, *O. hedĕræ* to ivy.

Or'obus, a sub-genus of the genus *Lathyrus* (which see).

Orog'raphy (Greek, *oros*, a mountain), the description of mountains, their chains, branches, &c., or the mountain systems of a country collectively.

Oronoko. See *Orinoco.*

Or'onsay. See *Colonsay.*

Oron'tes, a river of Syria, rising on the east of the Anti-Libanus, and entering the Mediterranean; entire course about 200 miles. It is not navigable.

Or'oshaza, a town of Hungary, about 30 miles north-east of Szegedin. Pop. 18,038.

Oro'sius, a Latin historian, born in Spain about 390 A.D., became a Christian presbyter, resided a considerable time with St. Augustine at Hippo, and wrote at his suggestion a general history of the world (Historiarum Libri vii. adversus Paganos), to prove that the Christians were not to blame for the downfall of the Roman empire as the heathen alleged. It is a worthless compilation, but for long enjoyed a great popularity, and was translated into Anglo-Saxon by King Alfred with modifications and additions.

Orota'va, a town and port of the Canary Islands, in the north-west of the island of Teneriffe. The town is about 3 miles from the port, and is a favourite summer residence of the rich Canarians. The port has a considerable trade. Pop. 8293.

Orphan Asylum, or ORPHANAGE, an establishment in which orphans are provided for and educated. In all well-regulated states the duty of taking care of destitute orphans was recognized at an early age, and it appears that the cities of Thebes, Athens, and Rome had establishments in which orphaned, deserted, and illegitimate children were supported and educated at the public expense. In the laws of Emperor Justinian there is frequent mention of such institutions. In the middle ages such asylums were numerous and generally under the direction of the clergy. In recent times public orphanages have been substituted or supplemented by the farming-out system, that is, the children are brought up in private families willing to undertake their charge. This system, with due care in the selection of guardians and judicious supervision, has proved satisfactory wherever it has been tried. It is more economical, and the example of respectable family life cannot fail to have a beneficial moral influence. Orphan asylums, as conducted in the United States, are supported as private institutions, assisted by legislative appropriation. They are fostered also by the religious denominations.

Orpheus (or'fūs), a personage of great importance in the mythology of Greece, surrounded by a multitude of legends, which invariably associate him with Apollo and the Muses. To him is attributed the application of music to the worship of the gods. Apollo presented him with his lyre, and the Muses instructed him to use it, so that he moved not the beasts only, but the woods and rocks with its melody. Having lost his wife Eurydice by the bite of a serpent he descended to Hades to try and get her back. His music so moved the infernal deities Pluto and Proserpine that they consented to her return to earth, only her husband, whom she was to follow, must not look back till they had reached the upper world. This condition the impatient Orpheus violated and lost his wife for ever. He is said

to have met his death at the hands of a band of furious women engaged in the mystic rites of Bacchus. He is represented as one of the Argonauts, and to him is ascribed the origin of the so-called Orphic mysteries connected with the worship of Bacchus. A considerable literature was connected with the name of Orpheus, the oldest portions of which were not earlier than 530 B.C. In part it yet exists, there being still extant a mythological poem called Argonautica, certain hymns, &c.

Or'piment, a mineral consisting of arsenic and sulphur, of a bright yellow colour, passing into golden; specific gravity, 3·3–3·5. It occurs in laminated or lamellar masses, in concretions, and more rarely in minute crystals. It is also manufactured artificially.

Or'rery, an instrument for representing the motions of the planets, &c., a useful assistant to the teacher of elementary astronomy. It was so called after the Earl of Orrery.

Orrery, CHARLES BOYLE, EARL OF, born 1676, died 1731. He was educated at Oxford, and succeeded his brother in the earldom (an Irish title) in 1708. For his services in connection with the Treaty of Utrecht he was created a British peer, as Lord Boyle. He published an edition of Phalaris, which gave rise to the controversy with Dr. Bentley. See *Bentley, Richard.*

Orris Root, or IRIS ROOT, the root of several species of *Iris*, especially of the *I. florentina*, which on account of its violet-like smell is employed in perfumery and in the manufacture of tooth-powder. It is also used in pharmacy as a pectoral.

Orsi'ni, one of the most illustrious and powerful families of Italy. It became known about the 11th century, and had already acquired high rank and extensive possessions in the Papal States when one of its members, Giovanni Gaetano, was raised to the pontificate under the title of Nicholas III. (1277–80). The feud between the Orsini and Colonna families is celebrated in history; it commenced towards the close of the 13th century, and is distinguished for bitterness, unscrupulousness, and violence, assassination being not unfrequently resorted to. Many of the Orsini became famous military chiefs. Vincenzo Marco Orsini (Benedict XIII.) succeeded Innocent XIII. as pope in 1724. (See *Benedict.*) The Orsini family is now divided into two branches, the Orsini-Gravina at Rome and the Orsini of Piedmont.

Orsini, FELICE, an Italian revolutionist, born in 1819. In 1838 he was sent to study law at the University of Bologna, and joined the Society of Young Italy, formed in 1831 by Mazzini. In 1843 he took an active part in an insurrection, and being apprehended along with his father, also an ardent patriot, was sentenced to the galleys for life. By the amnesty of the 16th July, 1846, he obtained his freedom, but soon after he again engaged in intrigues under Mazzini, and took prominent part in the stirring events of the following years. In 1855 he was condemned to death, but the sentence was not carried out, and in 1856 he escaped to London. Here he wrote his work Austrian Dungeons in Italy (1856), and lived by giving lectures on his adventures. He now planned the assassination of Napoleon III., as the main prop of reactionary tendencies in Europe, in concert with three Italian refugees, Rudio, Gomez, and Pieri. The attempt was made on 14th January, 1858, but was unsuccessful, and Pieri and Orsini were executed 13th March, 1858, Gomez and Rudio being sentenced to imprisonment for life.

Orsk, a town of Russia, government of Orenburg, near the mouth of the Or, in the Ural. Pop. 15,985.

Orsova (or'sho-vȧ), NEW ORSOVA, the name of two places near the Iron Gates of the Danube, the former a small town in Hungary, the latter a fortress in Servia, occupied by the Austrians.

Örsted, or OERSTED (eur'sted), HANS CHRISTIAN, Danish physicist, born in 1777, died at Copenhagen 1851. He studied at the University of Copenhagen, spent several years at the expense of government in Holland, Germany, and Paris; was in 1806 appointed extraordinary professor of physics at Copenhagen; and in 1812–13, while on a second tour in Germany, he drew up his views of the chemical laws of nature, which he afterwards published in Paris under the title of Recherches sur l'Identité des Forces Électriques et Chimiques. His fame first became diffused over the scientific world in 1819 by the discovery of the fundamental principles of electro-magnetism. In 1829 he became director of the Polytechnic School of Copenhagen, and on the occasion of his jubilee festival in 1850 he was created a privy-councillor.

Or'tegal, CAPE, the north-western point of Spain.

Orthez (or-tās), a town of France, department of Basses-Pyrénées, 24 miles north-

west of Pau, on a hill above the Gave-de-Pau. Soult was here defeated by Wellington, 27th February, 1814. Pop. 7112.

Or'thite, a silicate of aluminium containing the rare metals cerium, lanthanum, didymium, and yttrium, occurring in granite and other rocks in Sweden, Greenland, the Ural, &c.

Ortho'ceras, a genus of fossil cephalopods, having straight or slightly curved chambered shells, allied to the nautilus, and occurring from the Silurian to the Trias.

Or'thoclase, called also common or potash felspar, a silicate of aluminium and potassium found in fine monoclinic crystals disseminated in straight layers throughout the older rocks of many countries. The colour varies from white to green; it is transparent or translucent; specific gravity, 2·4 to 2·6; hardness, 6.

Or'thodox (Greek, *orthos*, right, and *doxa*, opinion), the opposite of *heterodox* (which see), generally applied to what is regarded as the established opinion, or that which is commonly considered as right. The term is chiefly used in religious controversies to designate certain religious faiths or doctrines.

Ortho'epy, that branch of grammatical knowledge which deals with correct pronunciation.

Orthographic Projection, a term more specially applied to that spherical projection used by geographers in the construction of maps in which the eye is supposed to be at an infinite distance from the sphere, so that the rays of light coming from every point of the hemisphere may be considered as parallel to one another. This method of projection is best adapted for representing countries at a moderate distance from the centre of projection. See *Projection*.

Orthography, that part of grammar which treats of the nature and properties of letters, and their proper application in writing words, making one of the four main divisions or branches of grammar.

Orthopæ'dia (Greek, *orthos*, straight, *paideia*, training), a branch of medical science relating to the cure of natural deformities. Hippocrates already occupied himself with the correction of deformed bones, but it was not until a comparatively recent epoch that this important subject met with the serious attention it deserves. Several institutions for the cure of bodily malformations were founded in France and Germany in the early part of this century. Orthopædia is divided into prophylactic or preventive, and therapeutic or curative. The object of the former is to prevent deformities in infants, and is obtained by hygienic means, such as pure air, careful nursing, and suitable food, clothing, and exercise; that of the latter to correct deformities already existing by mechanical treatment, which is most successful when resorted to as soon as any deviation from natural shape manifests itself. In our time the manufacture of orthopædic apparatus has become highly developed, and forms an important branch of trade.

Orthop'tera (Greek, *orthos*, straight, *pteron*, a wing), an order of insects of the sub-class Hemimetabola, or insects in which the metamorphosis is incomplete. They have four wings, the anterior pair being semi-coriaceous or leathery, usually with numerous nervures, the wings sometimes overlapping and sometimes meeting like the roof of a house. The feelers are generally straight, filiform organs. The limbs vary in conformation according to their methods of movement. In their metamorphosis the larvæ and pupæ are both active, and the pupa generally resembles the perfect insect, the wings being undeveloped. These insects are divided into Running (Cursorial) and Leaping (Saltatorial) Orthoptera. Of the former division the Cockroaches, Earwigs, Mantis Insects, Walking-stick Insects, and Walking Leaves form the chief families. The Saltatoria are represented by the Locusts, some of which want wings entirely, Crickets, and Grasshoppers. See also *Entomology*.

Ortler-Spitze, or ORTLER, a mountain of the Alps, in Tyrol, near the borders of Switzerland and Italy, the highest of the Austrian and German Alps; height, 12,814 feet. The group to which this mountain belongs is known as the Ortler Alps.

Or'tolan (*Emberiza hortulāna*), a bird of the bunting family, a native of Northern Africa and Southern Europe. The colours are yellow on the throat and around the eyes, the breast and belly being of reddish hue, whilst the upper part of the body is brown varied with black. Its delicate flesh is much esteemed by epicures, and large quantities are annually caught and fattened for the table in the south of France, Italy, and Cyprus.

Orto'na, a town and seaport of S. Italy, prov. Chieti, on the Adriatic, 11 miles east of Chieti. It has a cathedral and several other churches and convents. Pop. 6366.

Ortyx, an American genus of gallinaceous birds allied to the quails and partridges. See *Quail*.

Oru'ba. See *Aruba*.

Oru'ro, a town of Bolivia, capital of a department of the same name, on a bleak hill in a metalliferous district, at an absolute height of 13,000 feet. It has lost its former importance, and the population, once exceeding 40,000, is now below 12,000. The department has an area of 25,640 square miles and a pop. of about 170,000.

Orvie'to, an old town of Italy, province of Perugia, picturesquely situated on an isolated hill near the confluence of the Paglia and the Chiana, 60 miles N.N.W. of Rome. It is celebrated for its cathedral, built of black and white marble, and adorned with fine sculptures, mosaics, and paintings, a beautiful specimen of 13th century Italian Gothic. Pop. 7304.

Orycter'opus, the generic name of the aardvark, Cape pig, or ground-hog (*O. Capensis*) of South Africa, an edentate, insectivorous animal. See *Aardvark*.

Oryx, the name of the genus of antelopes represented by the addax (*Oryx nasomaculata*) and by other species, found in large herds chiefly in the northern portions of the African continent. The horns are very long, spiral, and curved backwards. The gemsbok (*Oryx Gazella*) of Southern Africa is another species included in this genus.

Osage, a river in the United States, which rises in Kansas, flows through Missouri, and after a winding course of 500 miles joins the Missouri 10 miles below Jefferson City. The river gave name to an Indian tribe, the remnant of which now inhabit the Indian Territory.

Osage Orange (*Maclŭra aurantiăca*), a tree of the nat. order Moraceæ (mulberry), indigenous to North America, where it is frequently used as a hedge-plant. It produces a large yellow fruit of a woody texture, somewhat resembling an orange, but not edible.

Osa'ka, or OHOSA'KA, the second city and a free port of Japan, in the island of Hondo, on the estuary of the Yodo Gawa, 28 miles S.S.W. of Kioto. It is intersected by canals, which are spanned by numerous wooden bridges. The banks of the main channel are lined for 2 or 3 miles with the residences of the nobles, and it has a strong citadel. A railway connects it with Yeddo. The greater part of its foreign trade is carried on at Hiogo. Pop. 1891, 473,541.

Osborne, a residence of Queen Victoria, in the Isle of Wight, 1 mile from East Cowes.

Oscans (L. *Osci*; Greek, *Opikoi*), an Italian people who appear to have been the occupants, at the earliest known period, of Central Italy. The Oscans were subdued by the Sabines or Sabellians. Their language was closely allied to the Latin. Some wall-inscriptions in it have been found in Pompeii. There are no remains of it except in coins and inscriptions.

Oscar I., JOSEPH FRANÇOIS BERNADOTTE, King of Sweden and Norway, son of Bernadotte (Charles XIV.), born at Paris in 1799, died 1859. In 1823 he married Josĕphine, eldest daughter of Prince Eugène Beauharnais. During the reign of his father he was three times (in 1824, 1828, and 1833) viceroy of Norway, where he made himself popular by his good administration. He acceded to the throne in 1844; reformed the civil and military administration of the state; abolished primogeniture; established complete liberty of conscience; encouraged education and agriculture; promoted railways, telegraphs, &c. He took little part in foreign politics. He resigned in favour of his eldest son in 1857.

Oscar II., King of Sweden and Norway, born 1829; succeeded his brother, Charles XV., in 1872. He is a writer of some merit; has translated Goethe's Faust into Swedish, and published a volume of poems under the pen-name of Oscar Frederik.

Oschatz (ō'shäts), a town of Saxony, about 30 miles to the east of Leipzig, with manufactures of woollens, leather, &c. Pop. 8711.

Oschersle'ben, Prussia, pop. 9671.

Oscillation, the act of swinging to and fro. The term is often indiscriminately applied to all sorts of forward and backward motions, but it has special reference to the movements of the pendulum, which are subject to well-established laws. See *Pendulum*.

Oshawa, town and port, Ontario co., Ont., Canada. It has a large malleable-iron works, piano factory, etc. 2 weekly newspapers. Pop. 4200.

Oshkosh, a city of the United States, capital of Winnebago county, Wisconsin, on Lake Winnebago, at the mouth of the Fox River. It has numerous saw and shingle mills, sash, door, and window factories, with other industrial establishments. Pop. 1890, 22,836.

Osian'der, ANDREAS, German theologian, zealous reformer, and follower of Luther, born in 1498, died 1552. He was present

at the Diet of Augsburg in 1530, and his refusal to consent to the Augsburg interim in 1548 cost him his situation as preacher at Nürnberg, but soon after he was appointed professor of theology in the newly-erected University of Königsberg. Afterwards he was appointed vice-president of the bishopric of Samländ. In 1549 he became involved in a theological dispute, in which he maintained that justification is not a judicial or forensic act in God, but contained something of a subjective nature, as the imparting of an internal righteousness, brought about in a mystical manner by the union of Christ with men. One of his principal opponents was Martin Chemnitz. Although his views were condemned by several authorities he maintained them until his death. In 1556 all the Osiandrists were deposed, and Osiandrism for ever banished out of Prussia.

Osier. See *Willow.*

Osi'ris, one of the great Egyptian divinities. He was the brother and husband of Isis, and the father of Horus. He is styled the Manifestor of Good, Lord of Lords, King of the Gods, &c. In the Egyptian theogony he represented the sum of beneficent agencies, as Set of evil agencies. Osiris, after having established good laws and institutions throughout Egypt, fell a prey to the intrigues of his brother Set, the Typhon of the Greeks. He became afterwards the judge of the dead. There are a multitude of traditions, both Greek and Egyptian, about Osiris. He is represented under many different forms, and compared sometimes to the sun and sometimes to the Nile. His soul was supposed to animate the sacred bull Apis, and thus to be continually present among men. His worship extended over Asia Minor, Greece, and Rome; the rise of Christianity put an end to it.

Osiris.

Oskaloosa, Mahaska co., Iowa, in one of the best coal regions of the West; large deposits of iron ore. Pop. 1890, 6558.

Osman Digna, a Soudanese slave merchant and lieutenant to the Mahdi, born at Suakin about 1830, of Turkish descent on his father's side. He has proved himself one of the ablest leaders on the Mahdist side, having defeated an Egyptian force under Baker Pasha in 1884 near the Red Sea coast of the Soudan. He was defeated soon after by a British force, and again in 1885, but not without causing severe losses.

Osman'ieh, a Turkish order established by Abdul Aziz in 1861 for the reward of services rendered to the state. The chief decoration is a golden six-pointed star enamelled in green.

Osman Pasha, Turkish general, born at Tokat in Asiatic Turkey 1832; entered the Turkish army in 1853; fought with distinction in the Crimean war, the Syrian rebellion, and the Crete campaign, but his great achievement was the defence of Plevna during the Russo-Turkish war (1877). Since then he has held the office of war minister and several other high posts.

Os'melite, called also *pectolite,* a white or grayish-white mineral which occurs in many localities in acicular monoclinic crystals, consisting of hydrated silicate of calcium and sodium.

Os'mium (symbol Os, atomic weight 199), one of the platinum metals, forming a bluish-white lustrous mass, having a specific gravity of 22·48, being thus the heaviest of all bodies. It may also be obtained in crystals, or as a black amorphous powder, which is very combustible. Osmium is the most infusible of all the metals. It combines with chlorine in different proportions, also with sulphur, and forms alloys with some other metals. Osmic acid acts as a powerful oxidizer, decarbonizing indigo, separating iodine from potassium iodide, converting alcohol into acetic acid, &c.

Osmo'sis, Os'mose, the tendency of fluids to pass through porous partitions and mix or become diffused through each other. It includes *endosmose,* or the tendency of a fluid to pass inwards into another through such a partition, and *exosmose,* or the tendency of a fluid outward. When two saline solutions, differing in strength and composition, are separated by a bladder, parchment paper, or porous earthenware, they mutually pass through and mix with each other; but they pass with unequal rapidities, so that, after a time, the height of the liquid on each side is different. Of all vegetable substances sugar has the greatest power of endosmose, and of animal substances albumen has the

greatest. Graham showed that osmose was due to the chemical action of the fluids on the septum. In fact the corrosion of the septum seems necessary for the existence of osmose. See also *Diffusion*.

Osmun'da, a genus of ferns, of the section Osmundaceæ, with free capsules opening by a longitudinal slit into two valves, no elastic ring, or instead of one a striated cup. The *Osmunda regālis*, the flowering or royal fern, which grows to the height sometimes of 10 feet, is a native of Britain and other parts of the Old World, as well as of N. America. It is often cultivated as an ornamental plant on account of its elegant appearance, the fructification forming a fine panicle somewhat resembling that of a flowering plant.

Osnabrück, or OSNABURG, an ancient town of Prussia, in Hanover, on the Hase, and 71 miles west of Hanover. In the old town it possesses many interesting buildings in Gothic and Renaissance style. It was formerly an important seat of linen manufacture, and gave the name to the kind of coarse linen known as osnaburg. Its chief manufactures are now chemicals, iron and steel, paper, cotton, and tobacco. It is the see of a bishop, and the seat of several courts and public offices. Pop. 35,899.

Osprey (*Pandion Haliaëtus*), a well-known raptorial bird, called also *fishing-kawk*, *fishing-eagle*, and *sea-eagle*. It occurs

Osprey (*Pandion Haliaëtus*).

both in the Old and New World, near the shores of the sea, or great rivers and lakes, and builds its nest in high trees and cliffs. It lives on fish, and pounces with great rapidity on its prey, as it happens to come near the surface of the water, the toes being armed with strong curved nails. The general body-colour is a rich brown, the tail being banded with light and dark (in the old birds the tail is pure white), head and neck whitish on their upper portions, and a brown stripe extends from the bill down each side of the neck; under parts of the body whitish, legs of a bluish tint. In length the osprey averages about 2 feet, the wings measuring over 4 feet from tip to tip. The female lays three or four eggs. The American bald-eagle (*Haliaëtus leucocephălus*) pursues the osprey, who drops his prey with the view of escaping, when the eagle immediately pounces after the descending fish, and seizes it ere it touches the water.

Ossa, a mountain of Northern Greece, in Thessaly, separated by the Vale of Tempe from Mount Olympus; height, 6348 feet.

Ossetes (os-sēts'), one of the numerous tribes or peoples inhabiting the Caucasus, belonging to the Indo-European or Aryan family, and to the Iranic branch of it. They are at a lower stage of civilization than some of the neighbouring peoples. Their religion consists of a strange mixture of Christianity, Mohammedanism, and Paganism. They number about 110,000.

Ossett (with Gawthorpe), a town of England, W. Riding of Yorkshire, 22 miles from Wakefield, with woollen mills, &c. Pop. 10,957.

Ossian, a personage of ancient Scottish or rather Irish history, to whom are attributed certain poems, the subject of a great literary controversy of the latter half of the 18th century and the commencement of the present one. It originated by the publication of two epics, Fingal (1762) and Temora (1763) by James Macpherson. (See *Macpherson, James.*) Both are a record of the deeds of a great Celtic hero, Fingal. In the first of these poems he is assumed to war with the Danes, leading to their ultimate expulsion; but in Temora he is placed farther back, and his struggles are with the Romans. These and some minor poems Macpherson attributed to Ossian, the son of Fingal, and alleged that his version was a literal translation of works which had been transmitted orally in the Gaelic language from bard to bard until the introduction of writing permitted them to be committed to manuscript. Immediately on the publication of Fingal it attained an immense popularity. It was translated within a year into all the principal languages of Europe, and numbered among its admirers the ripest scholars and the most distinguished men of genius of the

age. The question of authenticity which was raised immediately on the publication of Fingal was noticed with somewhat lofty disdain by Macpherson in his preface to Temora, and although he then professed to be able to meet it by the production of the originals, he generally maintained throughout the controversy an angry silence. At first the authority of Dr. Blair, who wrote an elaborate critical dissertation in favour of the authenticity of the poems, was regarded as of paramount authority throughout Europe; and notwithstanding the emphatic denunciation of Dr. Johnson, and objections of other critics, the believers in the genuineness of Ossian continued to hold their ground until Malcolm Laing's unsparing criticism, first in the introduction to his History of Scotland (1800), and afterwards in an annotated edition of the poems themselves (1805), gave a death-blow to the position of those who maintained the integrity of the Ossianic epics. In 1797 the Highland Society issued a committee to inquire into the authenticity of the poems. The report published in 1805 states that the committee had not been able to obtain any one poem the same in title and tenor with the poems published by Macpherson; that it was inclined to believe that he was in use to supply chasms, and to give connection by inserting passages which he did not find, and to add what he conceived to be dignity and delicacy to the original, by striking out passages, by softening incidents, by refining the language, &c., but that it was impossible to determine to what degree he exercised these liberties. In 1807, after the death of Macpherson and in accordance with his will, appeared the Gaelic originals of his poems, with a Latin translation, and accompanied by a new dissertation on their authenticity by Sir John Sinclair. Hence arose a new and singular controversy. It was asserted that these originals, the MSS. of which were all in the handwriting of Macpherson, were translated by himself from the English, and this charge seems to be about as well substantiated as that of the original fabrication. What appears really to have been decided, is that Ossian was a real or mythical Irish bard of the 2d or 3d century, of whom there are probably no authentic remains, although some brief poems, which cannot be traced further back than the 11th century, are attributed to him. There are numerous traditions regarding him both in Scotland and Ireland. That Macpherson possessed considerable, and often conflicting material, collected in the Highlands, which he worked up into a continuous whole, in epic form, and that he himself produced the connecting links, seems beyond doubt.

Ossification, the process of bone formation, which in all cases consists of the deposition of earthy or calcareous matter. It may take place by the deposition of osseous material in fibrous membranes, and thus the flat bones of the skull are developed; or by deposition in *cartilage*, as in the case of the long bones of the skeleton. The process of ossification in cartilage begins at various well-marked points called *centres of ossification*, where proliferation of cartilage cells and a deposit of lime salts occurs. (See also *Bone*.) Most organs of the body may become the seat of abnormal ossification. Deposits of limy matter take place frequently within the coats of arteries, making them easily ruptured; but this process is rather one of *calcification*.

Os'soli, Margaret Sarah Fuller, an American authoress, born in 1810, remarkable for her precocious and extensive linguistic attainments. She became associated with Emerson and other eminent literary men. In 1840 she started and edited the Dial (a social and philosophical magazine), and in 1844 became a writer to the New York Tribune. She visited Europe in 1846, married in 1847 the Marchese Ossoli; was in Rome during the siege of 1849, when she acted as superintendent of an hospital for the wounded, and embarked with her husband for New York, but they were wrecked, and both perished off Long Island, July 16, 1850. She wrote several works (besides translations), including Women in the Nineteenth Century, &c.

Ostade (os-tä'de), Adrian van, a painter of the Flemish school, and a pupil of Francis Hals, born at Lübeck in 1610, died at Amsterdam 1685. The coarse enjoyments of Dutch peasants formed the favourite subjects of his paintings, and the truth and animation he succeeded in throwing into his figures secured him a well-merited reputation. His pictures, amounting to several hundreds, are clear and rich in colouring, and highly finished. His brother and pupil, Isaac van Ostade, born 1621, died 1649, first imitated him, but was more successful in a style of his own (animated landscapes). He was often solicited by landscape-painters to add his figures to their pieces.

Ostashkov, a town of Russia, government of Tver, on Lake Seliger. It is favourably situated for trade, and its manufactures are progressing. Pop. 13,400.

Ostend', a seaport of Belgium, province of West Flanders, on the North Sea, 67 miles north-west of Brussels. It is situated on a sandy plain, and is protected against the sea by a solid wall of granite. The entrance to the port is narrow, and dangerous in bad weather, but the basins within are very extensive. The cod and herring fishing, and the cultivation of oysters, are considerable industries, and the export of butter, eggs, poultry, and rabbits is extensive. Owing to its extensive firm and smooth sands it is a favourite sea-bathing resort, especially for continental visitors. It dates from the 9th century. It sustained a memorable siege by the Spaniards from 4th July, 1601, to 28th Sept. 1604, when it capitulated. Pop. 1891, 25,203.

Osteol'ogy, the department of anatomical science specially devoted to a description of the bony parts or skeleton of the body, and included under the wider science of anatomy (which see, as also *Skeleton*, *Bone*, &c.).

Osterode (os'te-rō-dė), (1) a town of Prussia, in Hanover, at the foot of the Harz Mountains. It manufactures woollen, cotton, and linen goods, white-lead, leather, oil, machinery, &c. Pop. 6435. (2) A town of East Prussia, on a small lake (Drewenz) 75 miles south-west of Königsberg, with manufactures of machinery, distilleries, &c. Pop. 7123.

Os'tia, an ancient city of Italy, at the mouth of the Tiber, 6 miles from Rome by the Via Ostiensis. It was of great importance as the port of Rome and as a naval station, and for a long period it engrossed the whole trade of Rome by sea. The port, however, was never good, and owing to the gradual accumulation of the mud and other deposits brought down by the river it ultimately became inaccessible to ships of large tonnage. Many efforts were made by various Roman emperors to improve the port, but without much success. It was destroyed by the Saracens in the 9th century. Its ruins comprise tombs, two temples, a theatre, &c. The modern Ostia (founded by Gregory IV. in 830) is a miserable village with but few inhabitants.

Os'tiaks, or OSTYAKS, a race of Finnish origin, formerly numerous in several parts of Siberia, but which according to latest official returns now scarcely exceed 30,000, and are confined to the Obi and Irtish districts. In the latter they have become settled and Russianized, while in the former they mostly cling to their nomad life. They are generally low of stature, spare in figure, with dark hair, narrow eyes, large mouth, and thick lips.

Ostra'cion, the scientific name of the fishes known as trunk-fishes, included in the division Plectognathi, which forms a sub-order of the Teleostei or bony fishes. The body is inclosed in a literal armour-casing of strong bony plates or scales of the ganoid variety, which are immovably united, and invest every part of the body save the tail,

Ostracion or Trunk-fish (*O. triqueter*).

which is movable, but is itself inclosed in a bony casing. These fishes do not attain a large size, and are common in tropical seas.

Os'tracism (Greek, *ostrakon*, a shell), a political measure practised among the ancient Athenians by which persons considered dangerous to the state were banished by public vote for a term of years (generally ten), with leave to return to the enjoyment of their estates at the end of the period. It takes this name from the shell or tablet on which each person recorded his vote. Among the distinguished persons ostracized were Themistocles, Aristides, and Cimon, son of Miltiades, who were afterwards recalled.

Ostræ'a. See *Oyster*.

Os'trau, or MORAVIAN OSTRAU, a town of Austria, in Moravia, close to the frontier of Austrian Silesia, with coal-mines, iron-works, &c. Pop. 13,448.—POLISH OSTRAU, which adjoins this town, in Austrian Silesia, is engaged in the same industries. Pop. 9049.

Ostrich (*Struthio camēlus*), a cursorial bird, of the family Struthionidæ, of which it is the type. It inhabits the sandy plains of Africa and Arabia, and is the largest bird existing, attaining a height of from 6 to 8 feet. The head and neck are nearly

naked; the general body plumage is black, the wing and tail feathers white, occasionally with black markings; the quill-feathers of the wings and tail have their barbs wholly disconnected, hence their graceful appearance. The legs are extremely strong, the thighs naked. There are only two toes, the hallux or hind toe being wanting. The

African Ostrich (*Struthio camēlus*).

pubic bones are united, a conformation occurring in no other bird. The wings are of small size and are incapable of being used as organs of flight, but the birds can run with extraordinary speed, outdistancing the fleetest horse. The bill is broad and of a triangular depressed shape. The food consists of grass, grain, &c., and substances of a vegetable nature, and to aid in the trituration of this food the ostrich swallows large stones, bits of iron and glass, or other hard materials that come in the way. Ostriches are polygamous, each male consorting with several females, and they generally keep together in flocks. The eggs average 3 lbs. in weight, and several hens often lay from ten to twelve each in the same nest, which is merely a hole scraped in the sand. The eggs appear to be hatched mainly by the exertions of both parents relieving each other in the task of incubation, but also partly by the heat of the sun. The South African ostrich is often considered as a distinct species under the name of *S. austrālis*. Three South American birds of the same family (Struthionidæ), but of the genus *Rhea*, are popularly known as the American ostrich, and are very closely allied to the true ostrich, differing chiefly in having the head feathered and three-toed feet, each toe armed with a claw. (*See Rhea.*) The ostrich has been hunted from the earliest ages for its feathers, which have always been valued as a dress decoration. The feathers of the back are those most valued, the wing and tail feathers rank next. The black plumes are obtained by dying. The finest white feathers are exported from Aleppo, Egypt, Tunis, and Algiers, and the bulk of these find their way to Paris. Great Britain imports most of its ostrich feathers from Cape Colony. Ostriches having become scarce in that country, an attempt was made about 1858 to domesticate them, and with such success that ostrich-farming forms an important source of wealth. The market value of the feathers naturally varies with their quality, the prevailing fashion, and the supply. At present prime white feathers fetch from £20 to £50 per lb. The exports of feathers from Cape Colony have sometimes exceeded £1,000,000 per annum.

Ostrog, an old town in Russia, government of Volhynia. It is the place where the Bible was first printed in Slavonic. Pop. 16,522.

Ostrogoths. See *Goths.*

Ostro'wo, a town of Prussia, dist. Posen. Pop. 9128.

Ostu'ni, a town of S. Italy, prov. Lecce; olives and almonds are cultivated. Pop. 15,199.

Osu'na, a town of Southern Spain, in the province and 41 miles east of Seville. It consists of spacious well-paved streets, and has a magnificent church; manufactures of iron, linen, soap, articles in esparto, &c., and has a large trade in oil, grain, &c., with Seville and Malaga. Pop. 17,211.

Oswald, King of Northumbria, 634–642. He ruled over an extensive territory, including Angles, Britons, Picts, and Scots. He laboured to establish Christianity on a firm footing, being in this assisted by St. Aidan. He died in battle against Penda of Mercia, and was reverenced as a saint.

Oswaldtwistle, a town of England in Lancashire, 3 miles from Blackburn, with cotton factories, print-works, &c. Pop. 1891, 13,296.

Oswe'go, a city and port of the United States, in Oswego county, New York, on the Oswego, which here falls into Lake Ontario. It is beautifully situated, regularly and handsomely built, and is the great emporium for the traffic to New York from

Canada and the west. It is famous for its vast starch factory, and has extensive mills, tanneries, foundries, machine-shops, and ship-yards. The river supplies ample water-power. The entrance to the port is guarded by Fort Ontario. Pop. 1890, 21,842.

Oswestry (os'es-tri), a market town and municipal borough of England, county of Salop, 18 miles north-west of Shrewsbury. It is of great antiquity, deriving its name from Oswald, king of Northumbria, and makes some figure in early English history. Coal and limestone are worked in the neighbourhood. There are railway workshops, agricultural implement works, breweries, &c. Pop. 1891, 8496.

Osyman'dyas, an ancient king of Egypt, mentioned by Diodorus Siculus, who reports that he invaded Asia with a vast army, and penetrated as far as Bactria, and that on his return he erected at Thebes a monument to himself of unparalleled magnificence, with a sitting colossal statue of enormous size. The Memnonium at Thebes has been represented as his monument.

Ota'go, one of the provincial districts of New Zealand, including the whole of the southern part of South Island, south of the districts of Canterbury and Westland, being surrounded on the other three sides by the sea; area about 15,000,000 acres. The interior is mountainous; many peaks attain the height of from 3000 to 9000 feet, but there is much pastoral land; the N.E. consists of extensive plains. Otago, although it possesses valuable gold-fields, is chiefly a pastoral and agricultural district, second only to Canterbury in wheat production. The climate is similar to that of Britain, but warmer and more equable. The largest river is the Clutha or Clyde, the largest of New Zealand. There are also extensive lakes, as the Te Anau, 132 sq. miles; the Wakatipu, 112 sq. miles in area. Coal has been found in abundance. Otago was founded in 1848 by the Scotch Free Church Association; it is now the most populous division of the colony. The capital is Dunedin; the next town in importance is Oamaru. Pop. 1891, 153,097.

Otaheite (o-ta-hī'tē). See *Tahiti*.

Otal'gia, a painful affection of the ear. It may be due to inflammation of the ear; it may be a symptom of other diseases; or, it may be a species of neuralgia. It is often associated with other nervous ailments such as toothache, and neuralgic pains in the face; and as its intensity and duration generally depend upon the condition of the latter, otalgia is probably only a local symptom of the other troubles. Children, especially during their fast-growing period, are frequently subjected to otalgic pains. The treatment adopted in neuralgic affections is usually and with success also applied to this complaint.

Ota'ria, a genus of seals. See *Seal*.

Otfrid, or OTFRIED, a German theologian, philosopher, orator, and poet, who lived in the middle of the 9th century. He wrote a rhymed version or paraphrase of the Gospels, in old High German, still extant, in which there are some passages of lyrical poetry. He completed it about 868.

Othman. See *Caliph*.

Otho I., the *Great*, Emperor of Germany, son of Henry I., born 912, died 973. He was crowned king of Germany at Aix-la-Chapelle in 936. His reign of thirty-six years was an almost uninterrupted succession of wars. After a fourteen years' struggle he subdued Boleslas, duke of Bohemia; he wrested the duchies of Suabia, Bavaria, and Lorraine from the Dukes of Bavaria and Franconia, and gave them (in 949) to his sons Ludolf and Henry, and to his son-in-law Conrad, count of Worms, respectively. He delivered the Italians from the oppressions of Berengar II., married the widow of their last king, and was crowned king of Lombardy (951). In 961 he was crowned king of Italy, and in the following year emperor by Pope John XII., who took the oath of allegiance, but soon repented and took to arms. Otho deposed him and placed Leo VIII. in the papal chair; he also punished the Romans for replacing John after his departure. The Byzantine court refused to acknowledge Otho's claim to the imperial dignity; but he defeated the Greek forces in Lower Italy, and the eastern emperor, John Zimisces, gave the Greek Princess Theophania to his son Otho in marriage.

Otho II., youngest son of Otho I., was born in 955, died at Rome 983. His elder brothers had all died before their father, who caused him to be crowned king of Rome—the first instance of the kind in German history. He subdued the revolt of several powerful vassals, including his cousin, Henry II., duke of Bavaria. In Italy he suppressed a rising under Crescentius, and then attempted to drive the Greeks from Lower Italy; but they called in the aid of the Saracens from Sicily (981), and Otho suffered a total defeat (982). He escaped by leaping

into the sea, was picked up by a Greek ship, from which he afterwards escaped by a ruse, and died soon after at Rome.

Otho III., son of the preceding, and the last of the male branch of the Saxon imperial house, born 980, died 1002. He was only three years old when he succeeded his father. At the age of fifteen he marched into Italy and crushed a fresh insurrection fomented by Crescentius. He was consecrated emperor in 996 by Gregory V., a near relative of his own. He next suppressed a second rebellion under Crescentius, whom he caused to be beheaded. John XVI., the pope installed by the latter, was also captured, cruelly mutilated, and killed by the populace. On the death of Gregory, Otho raised his old tutor, Gerbert, to the pontificate under the title Sylvester II. Peace in Rome was, however, only temporary, and until his death Otho was mostly employed in quelling disturbances in various parts of Italy. Some historians assert that his death was due to poisoning, an act of revenge on the part of the widow of Crescentius.

Otho I., King of Greece, second son of Louis of Bavaria, born 1815, died 1867. In 1832 he was elected king of Greece; but his Germanic tendencies caused continual friction, which ended in a rebellion and his abdication (1862). He spent the latter part of his life in Munich.

Otho, Marcus Salvius, Roman emperor, born 32 A.D., died by his own hand 69 A.D. He joined Galba when he rebelled against Nero, and on his accession in 67 Otho became his favourite and was made consul; but when Galba appointed Piso as his successor Otto bribed the army, had Galba and Piso murdered, and was proclaimed emperor in 69. He was acknowledged by the eastern provinces, but in Germany Vitellius was proclaimed by his legions. The latter having led his army into Italy, overthrew the forces of Otho at Bebriacum, who killed himself after reigning for three months and a few days.

Otid'idæ, a family of carinate birds comprising the bustards.

Oti'tis, inflammation of the ear, accompanied with intense pain. Within the tympanum it is called internal, beyond it external otitis; and like all other inflammations it may be acute or chronic. Scrofulous and syphilitic constitutions are particularly liable to this disease. Internal otitis is often a serious malady, producing fever and delirium, and ending in suppuration, and generally in the rupture of the tympanum and more or less deafness. The treatment is similar to that of other inflammatory ailments.

Otley, a town of England, West Riding of Yorkshire, 10 miles north from Bradford. Worsted spinning and weaving, tanning and currying, &c., are carried on. Pop. 6806.

O'toliths, small vibrating calcareous bodies contained in the membranous cavities or labyrinths of the ears of some animals, especially of fishes and fish-like amphibia.

Otran'to (ancient, *Hydruntum*), a town of S. Italy, province of Lecce, or Terra di Otranto, on the strait of same name, 42 miles S.S.E. of Brindisi. It was once an important city, and its favourable position and harbour still secure it a certain amount of trade. Pop. about 4000.

Otranto, Duke of. See *Fouché*.

Ottar of Roses. See *Attar*.

Otta'va Rima (Italian, *octuple rhyme*), a form of versification consisting of stanzas of two alternate triplets, and concluding with a couplet. It seems to have been a favourite form with Italian poets even before the time of Boccaccio. The regular ottava rima is composed of eight eleven-syllable lines with dissyllabic rhyme.

Ottawa, Franklin co., Kans., a railway centre, has large manufacturing interests and an active trade. Pop. 1890, 6248.

Ot'tawa, a river in the Dominion of Canada, forming for a considerable part of its length the boundary between the provinces of Quebec and Ontario. It rises in the high land which separates the basin of Hudson's Bay from that of the St. Lawrence, about lat. 48° 30′ N., and after a course of some 750 miles discharges into the St. Lawrence above the island of Montreal. Six miles above the city of Ottawa rapids begin which terminate in the Chaudière Falls, where the river, here 200 feet wide, takes a leap of 40 feet. Its banks, mostly elevated, offer magnificent scenery. Immense quantities of valuable timber are floated down the Ottawa from the wooded regions of the interior to Ottawa city, where it is manufactured into lumber.

Ottawa, a city in the prov. of Ontario, capital of the Dominion of Canada, on the right bank of the Ottawa, about 90 miles above its confluence with St. Lawrence, 100 miles west of Montreal, and on the Canadian Pacific Railway. The city, divided into the Upper and Lower town by the Rideau Canal, has wide streets crossing

at right angles, and some of the finest buildings in the Dominion. The chief are the government buildings, constructed of light-coloured sandstone in the Italian-Gothic style. They stand on elevated ground commanding a fine view, and form three sides of a quadrangle, the south front being formed by the Houses of Parliament building, which is 500 feet long, and containing the halls for the meetings of the Dominion Senate and House of Commons. There is a library forming a detached circular building with a dome 90 feet high. The buildings cover about 4 acres, and are said to have cost £800,000. The educational institutions include a Roman Catholic College, the Canadian Institute, the Mechanics' Institute and Athenæum, &c. Ottawa has important and increasing manufactures, and is the great centre of the lumber trade. It is connected with Hull, on the Quebec side of the Ottawa, by a suspension bridge. Ottawa was founded in 1827 by Colonel By, and until 1854 was known as Bytown. In 1858 it became the capital of Upper and Lower Canada. The Canadian Parliament was first opened here in 1866. Pop. 44,154.

Ottawa, a city in the United States, Illinois, at the junction of the Illinois and Fox rivers, 82 miles south-west of Chicago. Pop. 1890, 9985.

Otter, a carnivorous mammal, family Mustelidæ or weasels, genus *Lutra*. There are several species, differing chiefly in size and fur. They all have large flattish heads, short ears, webbed toes, crooked nails, and tails slightly flattened horizontally. The

Otter (*Lutra vulgaris*).

common river-otter, the *Lutra vulgāris* of Europe, inhabits the banks of rivers, feeds principally on fish, and is often very destructive, particularly to salmon. The under fur is short and woolly, the outer is composed of longer and coarser hairs of dark-brown hue. They burrow near the water's edge, line their nest with grass and leaves, and produce from four to five young. The weight of a full-grown male is from 20 to 24 lbs.; length from nose to tail 2 feet, tail 15 to 16 inches. Otter-hunting in Great Britain is now limited to a few districts, the practical extinction of this interesting creature having put an end to the sport. A species of otter (*Lutra nair*) is tamed in India by fishermen, and used for hunting fish; and in Britain tame otters have occasionally been kept for a similar purpose. The American or Canadian otter (*Lutra Canadensis*) averages about 4 feet in length inclusive of the tail. It is plentiful in Canada, and furnishes a valuable fur, which is a deep reddish-brown in winter, and blackish in summer. The sea-otters (*Enhydra*), represented typically by the great sea-otter (*E. marīna*), inhabit the coasts of the North Pacific Ocean, but are of comparatively rare occurrence. The tail is short, measuring about 7 inches only; weight 60 to 70 lbs. The fur is soft, and of a deep lustrous black, or of a dark maroon colour when dressed, and much prized. In general appearance the sea-otter somewhat resembles a small seal.

Otto, German sovereign. See *Otho*.

Ottoman Empire, the Turkish Empire, the territories in Europe, Asia, and Africa more or less under the sway of the Turkish sultan. In Europe, besides the immediate provinces in the Balkan Peninsula, are Bulgaria (with Eastern Roumelia), and Bosnia, Herzegovina, &c., held by Austria; in Asia, Asia Minor, Syria, including Palestine, Mesopotamia, part of Arabia, Candia, and others of the islands of the Archipelago; in Africa, Egypt, over which there is a nominal suzerainty, and the vilayet of Tripoli. Formerly the empire was much more extensive, even in recent times comprising Greece, Roumania, Servia, Bessarabia, Tunis, &c. We shall here give a brief sketch of the history of the Ottoman Empire, referring to the article *Turkey* for information regarding the geography, constitution, &c., of Turkey proper.

The Ottoman Turks came originally from the region of the Altai Mountains, in Central Asia, and in the 6th century A.D. pushed onward to the west in connection with other Turkish tribes. Early in the 8th century they came in contact with the Saracens, from whom they took their religion, and of whom they were first the slaves and mercenaries, and finally the successors in the caliphate. In the 13th century they appeared as allies of the Seljukian Turks

against the Mongols, and for their aid received a grant of lands from the Seljuk sultan of Iconium in Asia Minor. Their leader, Othman or Osman, of the race of Oghuzian Turkomans, became the most powerful emir of Western Asia, and after the death of the Seljuk sultan of Iconium in the year 1300 he proclaimed himself sultan. He died in 1326. Thus was founded upon the ruins of the Saracen, Seljuk, and Mongol power the Empire of the Osman or Ottoman Turks in Asia; and after Osman, the courage, policy, and enterprise of eight great princes, whom the dignity of caliph placed in possession of the standard of the Prophet, and who were animated by religious fanaticism and a passion for military glory, raised it to the rank of the first military power in both Europe and Asia (1300–1566).

The first of them was Orkhan, son of Osman. He subdued all Asia Minor to the Hellespont, took the title of *Padishah*, and became son-in-law to the Greek emperor Cantacuzenus. Orkhan's son, Soliman, first invaded Europe in 1355. He fortified Gallipoli and Sestos, and thereby held possession of the straits which separate the two continents. In 1360 Orkhan's second son and successor, Amurath I., took Adrianople, which became the seat of the empire in Europe, conquered Macedonia, Albania, and Servia, and defeated a great Slav confederation under the Bosnian king Stephen at Kossova in 1389. After him Bajazet, surnamed Ilderim (*Lightning*), invaded Thessaly, and also advanced towards Constantinople. In 1396 he defeated the Western Christians under Sigismund, king of Hungary, at Nicopolis, in Bulgaria; but at Angora in 1402 he was himself conquered and taken prisoner by Timour, who divided the provinces between the sons of Bajazet. Finally, in 1413 the fourth son of Bajazet, Mohammed I., seated himself upon the undivided throne of Osman. In 1415 his victorious troops reached Salzburg and invaded Bavaria. He conquered the Venetians at Thessalonica in 1420; and his celebrated grand-vizier Ibrahim created a Turkish navy. Mohammed was succeeded by his son, Amurath II., who defeated Ladislaus, king of Hungary and Poland, at Varna in 1444. Mohammed II., the son of Amurath, completed the work of conquest (1451–81). He attacked Constantinople, which was taken May 29, 1453, and the Byzantine Empire came finally to an end. Since that time the city has been the seat of the Sublime Porte or Turkish government. Mohammed added Servia, Bosnia, Albania, and Greece to the Ottoman Empire, and threatened Italy, which, however, was freed from danger by his death at Otranto in 1480. His grandson, Selim I., who had dethroned and murdered his father in 1517, conquered Egypt and Syria. Under Soliman II., *the Magnificent*, who reigned between 1519 and 1566, the Ottoman Empire reached the highest pitch of power and splendour. In 1522 he took Rhodes from the Knights of St. John, and by the victory of Mohacz in 1526 subdued half of Hungary. He exacted a tribute from Moldavia, made Bagdad, Mesopotamia, and Georgia subject to him, and threatened to overrun Germany, but was checked before the walls of Vienna (1529). Soliman had as an opponent Charles V. of Germany, as an ally Francis II. of France. From his time the race of Osman degenerated and the power of the Porte declined.

In the latter part of the 16th century, and most of the 17th century, the chief wars were with Venice and with Austria. The battle of Lepanto (1571), in which the Ottoman fleet was overthrown by the combined fleets of Venice and Spain, was the first great Ottoman reverse at sea; and the battle of St. Gothard (1664), near Vienna, in which Montecuculi defeated the Vizier Kiuprili, the first great Ottoman reverse on land. In 1683 Vienna was besieged by the Turks, but was relieved by John Sobieski and Charles of Lorraine; in 1687 the Turks were again defeated at Mohacz, and in 1697 (by Prince Eugene) at Szenta. Then followed the Treaty of Carlowitz in 1699, by which Mustapha II. agreed to renounce his claims upon Transylvania and a large part of Hungary, to give up the Morea to the Venetians, to restore Podolia and the Ukraine to Poland, and to leave Azov to the Russians. Eugene's subsequent victories at Peterwardein and Belgrade obliged the Porte to give up, by the Treaty of Passarowitz in 1718, Temeswar, Belgrade, with a part of Servia and Walachia; but the Turks on the other hand took the Morea from Venice, and by the Treaty of Belgrade in 1739 regained Belgrade, Servia, and Little Walachia, while for a time they also regained Azov.

Russia, which had been making steady advances under Peter the Great and subsequently, now became the great opponent of Turkey. In the middle of the 18th century

the Ottoman Empire still embraced a large part of Southern Russia. The victories of Catharine II.'s general Romanzoff in the war between 1768 and 1774 determined the political superiority of Russia, and at the Peace of Kutchuk-Kainargi, in 1774, Abdul-Hamid was obliged to renounce his sovereignty over the Crimea, to yield to Russia the country between the Bog and the Dnieper, with Kinburn and Azov, and to open his seas to the Russian merchant ships. By the Peace of Jassy, 1792, which closed the war of 1787–91, Russia retained Taurida and the country between the Bog and the Dniester, together with Otchakov, and gained some accessions in the Caucasus. In the long series of wars which followed the French revolution the Ottoman Empire first found herself opposed to France, in consequence of Bonaparte's campaign in Egypt, and finally to Russia, who demanded a more distinct recognition of her protectorate over the Christians, and to whom, by the Peace of Bucharest, May 28, 1812, she ceded that part of Moldavia and Bessarabia which lies beyond the Pruth. In 1817 Mahmud II. was obliged to give up the principal mouth of the Danube to Russia. Further disputes ended in the Porte making further concessions, which tended towards loosening the connection of Servia, Moldavia, and Walachia with Turkey. In 1821 broke out the war of Greek independence. The remonstrances of Britain, France, and Russia against the cruelties with which the war against the Greeks was carried on proving of no avail, those powers attacked and destroyed the fleet of Mahmud at Navarino (1827). In 1826 the massacre of the Janizaries took place at Constantinople, after a revolt. In 1828–29 the Russians crossed the Balkans and took Adrianople, the war being terminated by the Peace of Adrianople (1829). In that year Turkey had to recognize the independence of Greece. In 1831–33 Mehemet Ali, nominally Pasha of Egypt, but real ruler both of that and Syria, levied war against his sovereign in 1833, and threatened Constantinople; when the Russians, who had been called on for their aid by the sultan, forced the invaders to desist. In 1840 Mehemet Ali again rose against his sovereign; but through the active intervention of Great Britain, Austria, and Russia, was compelled to evacuate Syria, though he was, in recompense, recognized as hereditary viceroy of Egypt.

The next important event in the history of the Ottoman Empire was the war with Russia in which Turkey became involved in 1853, and in which she was joined by England and France in the following year. This war, known as the Crimean war (which see), terminated with the defeat of Russia, and the conclusion of a treaty at Paris on the 30th of March, 1856, by which the influence of Russia in Turkey was greatly reduced. The principal articles were the abolition of the Russian protectorate over the Danubian principalities (Moldavia and Walachia, united in 1861 as the principality of Roumania), the rectification of the frontier between Russia and Turkey, and the cession of part of Bessarabia to the latter power.

In 1875 the people of Herzegovina, unable to endure any longer the misgovernment of the Turks, broke into rebellion. A year later the Servians and Montenegrins likewise took up arms, and though the former were unsuccessful and obliged to abandon the war, the Montenegrins still held out. Meantime the great powers of Europe were pressing reforms on Turkey, and at the end of 1876 a conference met at Constantinople with the view of making a fresh settlement of the relations between her and her Christian provinces. All the recommendations of the conference were, however, rejected by Turkey; and in April following, Russia, who had been coming more and more prominently forward as the champion of the oppressed provinces and had for months been massing troops on both the Asiatic and the European frontier of Turkey, issued a warlike manifesto and commenced hostile operations in both parts of the Turkish Empire. She was immediately joined by Roumania, who on the 22d of May (1877) declared her independence. The progress of the Russians was at first rapid; but the Turks offered an obstinate resistance. After the fall of Kars, however, Nov. 18, and the fall of Plevna, Dec. 10, the Turkish resistance completely collapsed, and on the 3d of March, 1878, Turkey was compelled to agree to the Treaty of San Stefano, in which she accepted the terms of Russia. The provisions of this treaty were, however, considerably modified by the Treaty of Berlin concluded on the 13th of July following by which Roumania, Servia, and Montenegro were declared independent; Roumanian Bessarabia was ceded to Russia; Austria was empowered to occupy Bosnia and Herzegovina; and Bulgaria was erected

into a principality. (See *Berlin, Treaty of.*)

The main events in the history of the Ottoman Empire since the conclusion of the Treaty of Berlin are the French invasion of Tunis in 1881, which soon after was formally placed under the protectorate of the French; the treaty with Greece, executed under pressure of the great powers in 1881, by which Turkey ceded to Greece almost the whole of Thessaly and a strip of Epirus; the occupation of Egypt by Great Britain in 1882; and the revolution at Philippopolis in 1885, when the government of Eastern Roumelia was overthrown, and the union of that province with Bulgaria proclaimed. The results of the revolution were recognized by an imperial firman in 1886, and Eastern Roumelia has since for all practical purposes formed part of Bulgaria.

Ot'tumwa, a city of the United States, the seat of Wapello county, Iowa, on the Des Moines River, 75 miles north-west of Burlington, an important railroad centre, and a place of growing commercial and industrial activity. Pop. 1890, 14,001.

Otway, THOMAS, an English writer of tragedy, born in 1651, and educated at Winchester and Oxford. He went to London, and in 1675 produced his first tragedy of Alcibiades. The following year appeared his Don Carlos, which proved extremely successful, and procured him a cornetcy in a regiment of cavalry destined for Flanders, in which country he served for a short time. He died in 1685 in a state of great destitution. As a tragic writer Otway excels in pathos. His fame chiefly rests upon the Orphan and Venice Preserved, the latter of which still maintains its place on the stage.

Oubliette (ö'bli-et), a dungeon existing in some old castles and other buildings, with an opening only at the top for the admission of air. It was used for persons condemned to perpetual imprisonment or to perish secretly.

Oudenarde (ö-du-ärd), a town of Belgium, province of East Flanders, on the Scheldt, 15 miles south of Ghent. It has sustained several sieges, but is best known in history by the memorable victory gained over the French on the 11th of July, 1708, by Prince Eugene and the Duke of Marlborough. Pop. 5880.

Oudh, or OUDE (oud), a province of British India, bounded on the north by Nepaul, and on other sides by the North-west Provinces; area 24,217 square miles. Oudh is a vast alluvial plain, watered by the Gogra, Gumti, Kapti, and Ganges. It is for the most part highly fertile, and wheat, barley, rice, sugar, indigo, and others of the richest products of India, are raised in large quantities. Oudh, formerly a Mogul province (subsequently kingdom, 1819), became subordinate to the British after the battle of Kalpee, in 1765. In 1856 complaints of the misgovernment of the king of Oudh led to the annexation of the country to the British dominions, an annual pension of £120,000 being settled on the king. This measure, however, produced much dissatisfaction, and when, in 1857, the mutiny broke out, most of the Oudh sepoys joined it, and the siege of Lucknow resulted. (See *Indian Mutiny.*) Since the pacification of 1858, schools and courts of justice have been established, and railways have been opened. In 1877 Oudh was partially amalgamated with the North-west Provinces by the unification of the two offices of chief commissioner and lieutenant-governor, but for most administrative purposes it remains a separate province. Lucknow is the capital, and the main centre of population and manufactures. Pop. 1891, 12,650,831 (mostly Hindus), giving the large average of 522 to the square mile.

Oudh (formerly Ayodhya), an ancient town in Faizabad District, Oudh, adjacent to Faizabad, on the river Gogra. In remote antiquity it was one of the largest and most magnificent of Indian cities, and is famous as the early home of Buddhism and of its modern representative, Jainism. A great fair, attended by about 500,000 people, is held every year. Pop. 11,643.

Oudinot (ö-di-nō), CHARLES NICOLAS, Duke of Reggio, peer and marshal of France, born in 1767. In 1791 he was elected commandant of a volunteer battalion, and gave many striking proofs of valour, which gained him speedy promotion. In 1792 he was colonel of the regiment of Picardy, in 1793 brigadier-general, and in 1799 general of division. Masséna made him chief of the general staff, and under his command he decided the battle of the Mincio. In 1804 Napoleon gave him the command of a grenadier corps of 10,000 men, which was to form the advance-guard of the main army. At the head of these troops he performed many exploits, winning the battle especially of Ostrolenka, and deciding the fate of three great battles — Austerlitz, Friedland, and Wagram. After the last-named battle Napoleon made him a mar-

shal and Duke of Reggio, and gave him an estate worth £4000 a year. He rendered valuable service and was severely wounded in the Russian campaign of 1812. In the campaign of 1813 he was defeated at Grossbeeren and Dennewitz. In the campaign of 1814 he took an active part and was wounded for the twenty-third time. After Napoleon's abdication he gave in his adhesion to the Bourbons, to whom he ever afterwards remained faithful, and who heaped upon him every honour. He died in 1847.—His eldest son, NICOLAS CHARLES VICTOR (born 1791), commanded the troops which effected the capture of Rome from Garibaldi in 1849. He died in 1863.

Ouida (wē'da). See *Ramée, Louisa de la.*

Ouless (ou'les), WALTER WILLIAM, English painter, born at St. Helier's, Jersey, 1848. He studied at the Royal Academy, and began as a painter of *genre*, but has distinguished himself chiefly in portraiture. He was elected R.A. in 1881. Darwin, Newman, Lord Selborne, Sir Fred. Roberts, Cardinal Manning, Samuel Morley, M.P., and other celebrities have been among his sitters.

Ounce (Latin, *uncia*, a twelfth part of any magnitude), in Troy weight, is the twelfth part of a pound, and weighs 480 grains; in avoirdupois weight is the sixteenth part of a pound, and weighs 437½ grains Troy.

Ounce (*Felis Uncia*), one of the digitigrade carnivora, found in Northern Africa, Arabia, Persia, India, and China. The length of the body is about 3½ feet, the tail measuring about 2 feet. It is a large cat, resembling the leopard and panther, but with a longer and more hairy tail and a thicker fur, somewhat less in size, and not so fierce and dangerous. In some places it is trained to hunt, like the cheetah.

Ou'rebi, *Scopophŏrus ourebi*, an antelope of South Africa, found in great numbers in the open plains, and much hunted for its flesh. It is from 2 to 3 feet high, of a pale dun colour, and the male has sharp, strong, and deeply-ringed horns.

Ouro-Preto, a town of Brazil, capital of the province of Minas-Geraes, 190 miles N.N.W. of Rio de Janeiro. It was formerly one of the great mining centres of Brazil, but its gold-mines are now nearly exhausted. Pop. 1890, 22,000.

Ouse (öz), a river of Yorkshire, formed by the junction of the Swale with the Ure near Boroughbridge; it flows tortuously south-east past York, Selby, and Goole, 8 miles east of which it unites with the Trent to form the estuary of the Humber. Its total course is 60 miles, for the last 45 of which (or to York) it is navigable.

Ouse (öz), GREAT, a river of England, rises near Brackley in the county of Northampton, flows in a general north-easterly direction, traverses the counties of Buckingham, Bedford, Huntingdon, Cambridge, and Norfolk, and falls into the Wash at King's Lynn, after a course of about 160 miles, for the latter two-thirds of which it is navigable.

Ousel. See *Ouzel.*

Ouseley, REV. SIR FREDERICK ARTHUR GORE, BART., English composer, born 1825, only son of Sir Gore Ouseley, at one time British ambassador to Persia and Russia. He succeeded his father in the baronetcy in 1844, and subsequently took orders. He exhibited from childhood high musical ability, took the degree of Bachelor of Music at Oxford in 1850, and of Doctor in 1855, and the same year was appointed precentor of Hereford Cathedral. His works include treatises on Harmony, on Counterpoint and Fugue, and on Musical Form and general composition, and he wrote much church music. He died in 1889.

Outcrop, in geology, the exposure of an inclined stratum at the surface of the ground.

Out'lawry, the putting one out of the protection of the law, a process resorted to against an absconding defendant in a civil or criminal proceeding. It involved the deprivation of all civil rights, and a forfeiture of goods and chattels to the crown. Outlawry in civil proceeding was formally abolished in England in 1879. In Scotland outlawry is a sentence pronounced in the supreme criminal court, where one accused of a crime does not appear to answer the charge. The effect is that he is deprived of all personal privilege or benefit by law, and his movable property is forfeited to the crown. In the United States the practice is unknown.

Outram (ou'tram), LIEUTENANT-GENERAL SIR JAMES, son of Benjamin Outram, civil engineer, and Margaret, daughter of Dr. Anderson, of Mounie, Aberdeenshire, was born at Butterley Hall, Derbyshire, 1803. His father dying in 1805, he was brought up in Scotland, studied at Marischal College, Aberdeen, and in 1819 went out as a cadet to India. In 1828 he was selected to undertake a mission to the wild hill tribes of the Bombay presidency, a task in which

he acquitted himself with credit. As adjutant to Lord Keane he took part in the Afghan war of 1839, and distinguished himself at the capture of Khelat, and by his dangerous ride disguised as a native devotee through the enemy's country to Kurrachee (1840). After the capture of Ghuznee, he performed the duties of British resident at Hyderabad, Sattara, and Lucknow. In 1842 he was appointed commissioner to negotiate with the Ameers of Sind, in which position he adopted views at variance with the aggressive policy of General Sir Charles James Napier. In 1856 he was nominated chief commissioner of Oudh. He was commander-in-chief of the British forces in the Persian war of 1856–57, and from Persia was summoned to India to aid in suppressing the mutiny. Although of higher rank than Havelock, whom he joined with reinforcements at Cawnpore in September, 1857, he fought under him until Lucknow was relieved by Sir Colin Campbell. In the following March he commanded the first division of infantry when Sir Colin finally regained possession of Lucknow. His services were rewarded with a baronetcy, the rank of lieutenant-general, the order of the grand-cross of the Bath, and the thanks of parliament; and statues were erected in his honour in London and Calcutta. The shattered state of his health compelled him to return to England in 1860, and he died at Pau in 1863, and was buried in Westminster Abbey.

Out'rigger, an iron bracket fixed on the side of a boat, with a rowlock at its extremity, so as to give an increased leverage to the oar without widening the boat; hence, a light boat for river matches provided with such apparatus. The name is also applied to a contrivance in certain foreign boats and canoes, consisting of a projecting framework or arrangement of timbers for counterbalancing the heeling-over effect of the sails, which are large in proportion to the breadth of the vessel.

Outworks, all works of a fortress which are situated without the principal line of fortification, for the purpose of covering the place and keeping the besiegers at a distance.

Ouviran'dra, a genus of plants. See *Lattice-leaf*.

Ouzel (ou'zl), a genus of insessorial or perching birds, included in the family of the thrushes. The common or ring ouzel (*Turdus torquātus*) is a summer visitant of Britain, and its specific name is derived from the presence of a broad semilunar patch or stripe of white extending across its breast. The water ouzel (*Cinclus aquaticus*) belongs to a different family. (See *Dipper*.) Ouzel is also an old or poetical name for the blackbird.

Oval, an egg-shaped curve or curve resembling the longitudinal section of an egg. The oval has a general resemblance to the ellipse, but, unlike the latter, it is not symmetrical, being broader at one end than at the other. See *Ellipse*.

Ovam'pos, a collection of black tribes of South-west Africa, occupying the exceedingly fertile country which lies south of the Cunene River, between 14° and 18° E. lon., and north of Damara-land. These black tribes resemble the Kafirs and Damaras in feature, and by many are supposed to be a connecting link between Negroes and Kafirs. Cattle forms the wealth of the Ovampo tribes, each of which has its own hereditary chief. They are also good agriculturists, and have made considerable progress in various arts.

Ovar', town of Portugal, district of Beira, near the Atlantic, on the north shore of the Bay of Aveiro, 22 miles south of Oporto; has valuable fisheries and considerable trade. Pop. 10,022.

Ova'rian Tumour, a morbid growth in the ovary of a woman, sometimes weighing as much as 30, 50, or upwards of 100 lbs. or more, consisting of a cyst containing a thin or thick ropy fluid, causing the disease known as *ovarian dropsy*, which is now generally cured by the operation of ovariotomy.

Ovariot'omy, the operation of removing the ovary, or a tumour in the ovary (see above); a surgical operation first performed in 1809, and long considered exceedingly dangerous, but latterly performed with great and increasing success, especially since the adoption of the antiseptic treatment inaugurated by Lister.

O'vary, or OVARIUM, the essential part of the female generative apparatus in which the ova or eggs are formed and developed. The ovary in the female corresponds to the *testis* of the male. In adult women the ovaries exist as two bodies of somewhat oval shape, and compressed from side to side, of whitish colour and uneven surface. They are situated one on each side of the womb, and are attached to the hinder portion of the body of the womb by two thin cord-like bands—the *ovarian ligaments*, and by a lesser fibrous cord to the fringed edge of the

fallopian tube. Each ovary is about 1½ inch in length, and about 1½ drachms in weight, and contains a number of vesicles known as ovisacs or Graafian follicles, in which the ova are developed. The functions of the ovary, which are only assumed and become active on the approach of puberty, are the formation of ova, their maturation, and their final discharge at periodic menstrual epochs into the uterus or womb. There the ovum may be impregnated and detained, or pass from the body with the menstrual flow. The ovaries are subject to diseased conditions, chief among which are cancer and the occurrence of tumours and cysts. See *Ovarian Tumour*, *Ovariotomy*.

O'vary, in botany, is a hollow case inclosing ovules or young seeds, containing one or more cells, and ultimately becoming the fruit. Together with the style and stigma it constitutes the female system of the vegetable kingdom. When united to the calyx it is called inferior; when separated, superior.

Ovation. See *Triumph*.

Oven, a close chamber of any description in which a considerable degree of heat may be generated, used for baking, heating, or drying any substance. In English the term is usually restricted to a close chamber for baking bread and other food substances, but ovens are also used for coking coal, in the arts of metallurgy, in glass-making, pottery, &c. There is now a great diversity in the shape and materials of construction, and modes of heating ovens.

Oven Birds, birds belonging to the family Certhidæ or Creepers, found in S. America; typical genus, *Furnarius*. They are all of small size, and feed upon seeds, fruits, and insects. Their popular name is derived from the form of their nest, which is dome-shaped, and built of tough clay or mud with a winding entrance.

Ovens River, a river in the north-east of the Australian colony of Victoria, a tributary of the Murray. The district is an important gold-mining and agricultural one.

Over, an ancient town of Cheshire, 4 miles W. of Middlewich, has boat-building and manufactures of salt. Pop. 5548.

Overbeck, FRIEDRICH, a German painter, born at Lübeck 1789, died 1869. He commenced his artistic studies in Vienna in 1806, and in 1810 went to Rome, where he, with Cornelius, Schadow, Veit, and Schnorr, founded a new school of art, which subordinated beauty to piety, and attempted to revive the devotional art of the pre-Raphaelite period. In 1814, in company with several of his artistic brethren, he abjured Lutheranism, embraced the Roman Catholic faith, and made Rome almost exclusively the place of his abode. Among his chief works are: The Entrance of Christ into Jerusalem; Christ on the Mount of Olives; The Entombment; The Triumph of Religion; The Vision of St. Francis; two series of frescoes, one on the History of Joseph for the Casa Bartholdi, and one on Tasso's Gerusalemme Liberata for the Villa Massimi at Rome; &c.

Overbury, SIR THOMAS, known as a miscellaneous writer, but more especially for his tragical death at the instance of the Earl of Rochester and the Countess of Essex, was born in Warwickshire in 1581, and studied at Oxford. He contracted an intimacy with Rochester, then Robert Carr, at the court of James I., and provoked the anger of the countess by endeavouring to dissuade his friend from marrying her. Rochester had the address to procure the imprisonment of his friend in the Tower of London, by creating a cause of offence between him and the king, and, some months later, caused him to be poisoned there, September 15, 1613. Though suspicions were entertained at the time, it was not till 1616 that this deed of darkness was discovered, when the inferior agents were all apprehended, tried, and executed. Rochester, now earl of Somerset, and the countess were also tried and condemned, but they were both pardoned by the king for private reasons. Overbury's Characters, and The Wife, a didactic poem, published in 1614, have still a reputation.

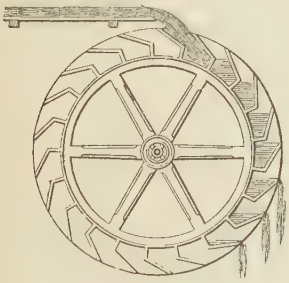
Over Darwen. See *Darwen*.

Overijssel (ō'vėr-ī-sėl), or OVERYSSEL, a province of the Netherlands; area, 1283 square miles. It is watered by the Ijssel, which separates it from Gelderland, and by the Vecht and its affluents. Except a strip along the Ijssel, presenting good arable and meadow land, the surface is mostly a sandy flat relieved by hillocks, and the principal industry is stock-raising and dairy-farming. Chief towns, Zwolle, Deventer, Almelo, and Kampen. Pop. 1892, 300,493.

Overland Route to India, the route *via* Dover, Calais, Paris, Lyons, the Mont Cenis Tunnel, Modena, to Brindisi, thence by steamer to Port Said, through the Suez Canal, and down the Red Sea to the destined Indian port. An alternative route is from Marseilles or Trieste by steamer to Alexandria, and thence by rail to Suez.

Overseers, public officers appointed annually in every parish of England and Wales, whose primary duty it is to assess the inhabitants for the poor-rate, collect the same, and apply it to the relief of the poor. The office is compulsory, and entirely gratuitous; but several classes of persons, such as peers, members of parliament, clergymen, Dissenting ministers, barristers, attorneys, doctors, military and naval officers, and others whose avocations require continual personal attendance, are exempt from serving. Numerous miscellaneous duties, other than their original duty of relieving the poor, are now imposed, by statute, on overseers. Thus they have to draw up the lists of all those entitled to vote for members of parliament, of those qualified to serve as jurors and as parish constables, &c. In the larger parishes it is customary for the inhabitants in vestry assembled to appoint assistant overseers, salaried officials who relieve the annual overseers to some extent of their duties.

Overshot Wheel, a wheel driven by water shot over from the top. The buckets of the wheel receive the water as nearly as possible



Overshot Water-wheel.

at the top, and retain it until they approach the lowest point of the descent. The water acts principally by its gravity, though some effect is of course due to the velocity with which it arrives.

O'verture, in music, an introductory symphony, chiefly used to precede great musical compositions, as oratorios and operas, and intended to prepare the hearer for the following composition, properly by concentrating its chief musical ideas so as to give a sort of outline of it in instrumental music. This mode of composing overtures was first conceived by the French. Overtures are, however, frequently written as independent pieces for the concert-room.

Ovibos. See *Musk-ox.*

Ovid, in full PUBLIUS OVIDIUS NASO, a celebrated Roman poet, born 43 B.C. He enjoyed a careful education, which was completed at Athens, where he gained a thorough knowledge of the Greek language. He afterwards travelled in Asia and Sicily. He never entered the senate, although by birth entitled to that dignity, but filled one or two unimportant public offices. Till his fiftieth year he continued to reside at Rome, enjoying the friendship of a large circle of distinguished men. By an edict of Augustus, however (A.D. 8), he was commanded to leave Rome for Tomi, a town on the inhospitable shores of the Black Sea, near the mouths of the Danube. It is impossible now to come to any certain conclusion as to the cause of this banishment, that given in the edict—the publication of the Art of Love—being merely a pretext, the poem having been in circulation ten years previously. The real cause may have been his intrigue with Julia, the clever but dissolute daughter of Augustus, whom he is supposed to have celebrated under the name of Corinna; or it may have been his complicity in the intrigue of Julia, the granddaughter of Augustus, with Silanus. The change from the luxurious life of a Roman gallant to that of an exile among barbarians whose very language was unknown to him must have been far from agreeable, and we find him addressing humble entreaties to the imperial court to shorten the term or change the place of banishment; but these entreaties, backed up by those of his friends in Rome, were of no avail; and Ovid died at Tomi in the year 18 A.D. He had been three times married. His works include Amorum Libri III., love elegies; Epistolæ Heroïdum, letters of heroines to their lovers or husbands; Ars Amatoria, Art of Love; Remedia Amoris, Love Remedies; the Metamorphoses, in fifteen books; Fasti, a sort of poetical calendar; Tristia; Epistolæ ex Ponto, Epistles from Pontus; &c.

Ov'iduct, the name given to the canal by which, in animals, the ova or eggs are conveyed from the ovary to the uterus or into the external world. In mammals the oviducts are termed *Fallopian tubes,* being so named after the anatomist who first described them.

Oviedo (ō-vi-ā'dō), a town of Spain, capital of a province of same name, 230 miles north-west of Madrid. It was founded in 762, has a 14th-century cathedral and a

university, and manufactures of hats, arms, napery, &c. Pop. 35,609.—The province, area 4080 square miles, pop. 596,856, is situated on the Bay of Biscay, and bounded by the provinces of Santander, Leon, and Lugo. It has a wild and stormy coast, and a mountainous interior better adapted for pasture than agriculture.

Oviedo y Valdez (ō-vi-ā′*dō* ē vàl-*deth*′), GONZALO FERNANDEZ DE, a Spanish historian, born in 1478, and brought up as a page at the court of Ferdinand and Isabella. In 1514 he received a government appointment in the newly-discovered island of Hispaniola, and with few intervals spent the rest of his life there. Named by Charles V. historiographer of the Indies, he wrote his Historia General y Natural de las Indias Occidentales. This and his Quinquagenas are two works of great historical value. He died at Valladolid in 1557.

Ovip′arous, a term applied to those animals which produce ova or eggs from which the young are afterwards hatched. Where the eggs—as in some lizards, some snakes, or as in the land salamanders—are retained within the body of the parent until such time as the young escape from them, the animals are said to be *ovo-viviparous*.

Ovipos′itor, an appendage attached to the abdominal segments of certain insects, and used for placing the eggs in situations favourable to their due development, this being sometimes in bark or leaves, or even in the bodies of other animals. The sting of bees, wasps, &c., is a modification of an ovipositor or analogous structure.

Ov′olo, in architecture, a convex moulding, generally a quarter of a circle; but in classic architecture there is usually a departure from the exact circular form to that of an egg: hence the name (L. *ovum*, an egg).

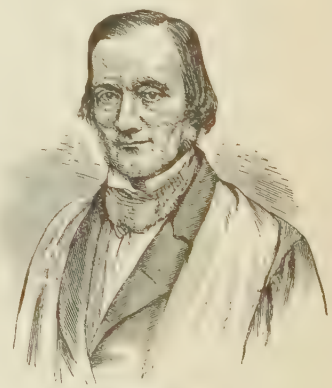
Ovo-viviparous. See *Oviparous*.

Ov′ule, in botany, a rudimentary seed which requires to be fertilized by pollen before it develops. It is composed of two sacs, one within another, which are called primine and secundine sacs, and of a nucleus within the sacs. At one point, the *chalaza*, the nucleus and the two coats come into contact, and here there is a minute orifice called the *foramen* or *micropyle*. See *Botany*.

Ovum, the 'egg' or essential product of the female reproductive system, which, after impregnation by contact with the semen or essential fluid of the male, is capable of developing into a new and independent being. The essential parts to be recognized in the structure of every true ovum or egg consist, firstly, of an outer membrane known as the *vitelline membrane*. Within this is contained the *vitellus* or *yolk*, and imbedded in the yolk-mass the *germinal vesicle* and smaller *germinal spot* are seen. See *Ovary*, *Reproduction*.

Owen, JOHN, D.D., English Nonconformist divine, born at Stadham, Oxfordshire, in 1616, studied at Oxford, and on the breaking out of the civil war took part with the Parliament. He adopted the Independent mode of church government. He was appointed to preach at Whitehall the day after the execution of Charles I.; accompanied Cromwell in his expeditions both to Ireland and Scotland; in 1651 was made dean of Christ Church College, Oxford, and in 1652 was nominated by Cromwell, then chancellor of the university, his vice-chancellor, offices of which he was deprived in 1657. He died in 1683. Owen was a man of great learning and piety, of high Calvinistic views, and the author of numerous works, the most permanently valuable of which is his Exposition of the Epistle to the Hebrews.

Owen, SIR RICHARD, K.C.B., comparative anatomist and palæontologist, was born at Lancaster 1804, and educated at Lancaster



Sir Richard Owen.

Grammar School and the medical schools of Edinburgh, Paris, and London. Having settled in the metropolis he became assistant curator of the Hunterian Museum. In 1834 he was appointed professor of comparative anatomy at St. Bartholomew's Hospital; in 1836 professor in anatomy and physiology

at the Royal College of Surgeons, and in 1856 superintendent of the natural history department in the British Museum, from which last post he retired in 1883. Owen is acknowledged to be the greatest palæontologist since Cuvier, and as a comparative anatomist a worthy successor to Hunter. He is a voluminous writer on his special subjects, and an honorary fellow of nearly every learned society of Europe and America. Among his works are Lectures on the Comparative Anatomy of the Invertebrate Animals; Lectures on the Comparative Anatomy of the Vertebrate Animals; History of British Fossil Mammals and Birds; History of British Fossil Reptiles; Principles of Comparative Osteology; On the Anatomy of Vertebrates; The Fossil Reptiles of S. Africa; The Fossil Mammals of Australia; &c. He died Dec. 18, 1892.

Owen, ROBERT, philanthropist and social theorist, born at Newtown, Montgomeryshire, North Wales, in 1771, died there 1858. Early distinguished by his business talents, at the age of eighteen he became manager of a spinning-mill at Chorlton, near Manchester, and subsequently of the New Lanark cotton-mills, belonging to Mr. Dale, a wealthy Glasgow manufacturer, whose daughter he married. Here Owen introduced many important reforms, having for their object the improvement of the condition of the labourers in his employ. In 1812 he published New Views of Society, or Essays upon the Formation of Human Character; and subsequently a Book of the New Moral World, in which he completely developed his socialistic views, insisting upon an absolute equality among men. He had three opportunities of setting up social communities on his own plan—one at New Harmony in America, another at Orbiston in Lanarkshire, and the last in 1844, at Harmony Hall in Hampshire, all of which proved signal failures. In his later years Mr. Owen became a firm believer in Spiritualism. His eldest son, Robert Dale Owen, (1801–77), for a time resident minister of the United States at Naples, is chiefly known as an exponent of spiritualism. He was author of several works on that and other subjects. Another son, David Dale Owen (1807–60), acquired reputation as a geologist.

Owensborough, a city of the United States, the seat of Daviess county, Kentucky, on the Ohio, 160 miles from Louisville, is extensively engaged in the curing of tobacco and the manufacture of whisky. Pop. 1890, 9837.

Owens College, Manchester, was established under the will of John Owens, a Manchester merchant, who died in 1846, and left about £100,000 for the purpose of founding an institution for providing a university education, in which theological and religious subjects should form no part of the instruction given. Teaching commenced in 1851, and the present handsome Gothic building for the accommodation of the college was completed in 1873. The increasing success of the college led to the establishment of a new University, Victoria University, to consist of Owens College and several affiliated colleges located in different towns, but having its headquarters in Manchester. The Victoria University was instituted by royal charter in 1880, with power to grant degrees in arts, science, and law, a supplemental charter, granted May, 1883, giving power to grant degrees in medicine. University College, Liverpool, was incorporated with Victoria University in 1884, and the Yorkshire College, Leeds, in 1888. There is a women's department in connection with Owens College, the classes being held in separate buildings. The charter of Victoria University gives power to grant degrees to women, and the examinations are thrown open to them.

Owen Sound, Ontario, Canada, on the Canadian Pacific Railway. Pop. 1891, 7497.

Owhyhee (o-wī'hē), the same as Hawaii. See *Sandwich Islands.*

Owlglass, or HOWLEGLASS. See *Eulenspiegel.*

Owl Parrot (*Strigops habroptilus*), the type and only known representative of a peculiar group of the parrot family, is a large bird, a native of the South Pacific Islands, and especially of New Zealand. In aspect and in nocturnal habits it resembles the owl. It feeds on roots, which it digs out of the earth with its hooked beak. It seldom flies; it is generally to be seen resting in hollow stumps and logs, and is said to hibernate in caves.

Owls, a group of birds forming a well-defined family (Strigidæ), which in itself represents the Nocturnal Section of the order of Raptores or Birds of Prey. The head is large and well covered with feathers, part of which are generally arranged around the eyes in circular discs, and in some species form horn-like tufts on the upper surface of the head. The beak is short, strongly curved, and hooked. The ears are generally of large

size, prominent, and in many cases provided with a kind of fleshy valve or lid, and their sense of hearing is exceedingly acute. The eyes are very prominent and full, and project forwards, the pupils being especially well developed—a structure enabling the owls

Barn-owl (*Strix flammĕa*).

to see well at dusk or in the dark. The plumage is of soft downy character, rendering their flight almost noiseless. The tarsi are feathered, generally to the very base of the claws, but some forms, especially those of fish-catching habits, have the toes and even the tarsi bare. The toes are arranged

Long-eared Owl (*Asio otus*).

three forwards and one backwards; but the outer toe can be turned backwards at will, and the feet thus converted into hand like or prehensile organs. In habits most species of owls are nocturnal, flying about during the night, and preying upon the smaller quadrupeds, nocturnal insects, and upon the smaller birds. Mice in particular form a large part of their food. During the day they inhabit the crevices of rocks, the nooks and crannies of old or ruined buildings, or the hollows of trees; and in these situations the nests are constructed. They vary greatly in size, the smallest not being larger than a thrush. In their distribution the owls occur very generally over the habitable globe, both worlds possessing typical representatives of the group. The common white or barn owl (*Strix flammĕa*) is the owl which has the greatest geographical range, inhabiting almost every country in the world. The tawny or brown owl (*Strix stridŭla*) is the largest of the species indigenous to Britain, and is strictly a woodland bird, building its nest in holes of trees. The genus *Asio* contains the so-called horned owls, distinguished by elongated horn-like tufts of feathers on the head. The long-eared owl (*Asio otus* or *Otus vulgāris*) appears to be common to both Europe and America. It inhabits woods. The short-eared owl (*Asio accipitrīnus* or *Otus brachyōtus*) frequents heaths, moors, and the open country generally to the exclusion of woods. It has an enormous geographical range. The eagle owl (*Bubo ignāvus*) is rare in Britain, but occurs in Norway, Sweden, and Lapland, and over the continent of Europe to the Mediterranean. A similar species (*B. Virginianus*) extends over the whole of North America. Owls of diurnal habits are the hawk owl (*Surnia*) and the snowy owl (*Nyctea*). The hawk owl mostly inhabits the Arctic regions, but migrates southwards in winter, as does the snowy owl, which is remarkable for its large size and snowy plumage. The little owl (*Carine noctua*), the bird of Pallas Athena, is spread throughout the greater part of Europe, but is not a native of Britain. One of the most remarkable of owls is the burrowing owl (*Athēna cunicularia*) of America and the West Indies, which inhabits the burrows of the marmots (which see), or prairie-dogs.

Owosso, in Shiawassee co., Mich., on Shiawassee R., which affords good water-power. Pop. 1890, 6564.

Ox, the general name of certain well-known ruminant quadrupeds, sub-family Bovidæ (Cavicornia). The characters are: the horns are hollow, supported on a bony core, and curved outward in the form of crescents; there are eight incisor teeth in the under jaw, but none in the upper; there are no canines or dog-teeth; the naked muffle is broad. The species are *Bos Taurus*, or common ox; *B. Urus*, aurochs, or bison of Europe; *B. Bison*, or buffalo of North America; *B. Bubalus*, or proper buffalo of the eastern continent; *B. caffer*, or Cape buffalo; *B. grunniens*, or yak

of Thibet, &c. (See *Bison, Buffalo, Yak,* &c.) The common ox is one of the most valuable of our domestic animals. Its flesh is the principal article of animal food; and there is scarcely any part of the animal that is not useful to mankind; the skin, the horns, the bones, the blood, the hair, and the very refuse of all these, have their separate uses. Having been specially domesticated by man from a stock which it is probably impossible to trace, the result has been the formation of very many breeds, races, or permanent varieties, some of which are valued for their flesh and hides, some for the richness and abundance of their milk, while others are in great repute both for beef and milk. Among the first class, or those valued for feeding purposes, may be mentioned the *Durham* or *Short-horn*, the *Polled Aberdeen* or *Angus*, and the *West Highland* or *Kyloe*. Among the most celebrated for dairy purposes are the *Alderney*, the *Ayrshire*, and the *Suffolk Dun*. For the purposes both of the dairy-farmer and the grazier the *Hereford* and a cross between a *Short-horn* and an *Ayrshire* are much fancied. The ox is used in many parts of the world, and in a very few districts of Britain, as a beast of draught. The *North Devon* breed is well adapted for draught, and in Devonshire much agricultural labour is still performed by teams of oxen of this breed. The 'wild ox,' now existing only in a few parks, as at Hamilton in Lanarkshire, and Chillingham in Northumberland, seems, whatever its origin, to have been formerly an inhabitant of many forest districts in Britain, particularly in the north of England and the south of Scotland. The name ox is used also in a more restricted sense to signify the male of the bovine genus (*Bos Taurus*) castrated, and full-grown, or nearly so. The young castrated male is called a *steer*. He is called an *ox-calf* or *bull-calf* until he is a year old, and a *steer* until he is four years old. The same animal not castrated is called a *bull*. Besides the European ox there are several other varieties, as the Indian or zebu, with a hump on its back, the Abyssinian, Madagascar, and South African.

Oxal'ic Acid, an acid which occurs, combined sometimes with potassium or sodium, at other times with calcium, in wood-sorrel (*Oxălis Acetosella*) and other plants; and also in the animal body, especially in urine, in urinary deposits, and in calculi. Many processes of oxidation of organic bodies produce this substance. Thus sugar, starch, cellulose, &c., yield oxalic acid when fused with caustic potash, or when treated with strong nitric acid. Saw-dust is very much used for producing the acid. Oxalic acid has the formula $C_2H_2O_4$; it is a solid substance, which crystallizes in four-sided prisms, the sides of which are alternately broad and narrow, and the summits dihedral. They are efflorescent in dry air, but attract a little humidity if it be damp. They are soluble in water, and their acidity is so great that, when dissolved in 3600 times their weight of water, the solution reddens litmus paper, and is perceptibly acid to the taste. Oxalic acid is used chiefly as a discharging agent in certain styles of calico-printing, for whitening leather, as in boot-tops, and for removing ink and iron mould from wood and linen. It is a violent poison. *Oxalates* are compounds of oxalic acid with bases; one of them, binoxalate of potash, is well known as salts of sorrel or salts of lemon.

Oxalida'ceæ, a natural order of polypetalous exogenous plants, of which the genus *Oxălis* or wood-sorrel is the type, comprising herbs, shrubs, and trees, remarkable, some of them, for the quantity of oxalic acid they contain. Some American species have tuberous edible roots. For two species see *Blimbing* and *Carambola*.

Oxalu'ria, a morbid condition of the system, in which a prominent symptom is the presence of crystallized oxalate of lime in the urine.

Oxenstjerna, Axel, Count, Swedish statesman, born 1583, studied theology at Rostock, Wittenberg, and Jena; and in 1602, after visiting most of the German courts, returned to Sweden and entered the service of Charles IX. In 1608 he was admitted into the senate; and on the accession of Gustavus Adolphus, in 1611, he was made chancellor. He accompanied Gustavus Adolphus during his campaigns in Germany, taking charge of all diplomatic affairs; and on the fall of his master at Lützen (1632) he was recognized, at a congress assembled at Heilbronn, as the head of the Protestant League. This league was held together and supported solely by his influence and wisdom, and in 1636 he returned to Sweden after an absence of ten years, laid down his extraordinary powers, and took his seat in the senate as chancellor of the kingdom and one of the five guardians of the queen. In 1645 he assisted in the negotiations with Denmark at Bromsebro, and on his return was created count by Queen Christina, whose determination to

abdicate the crown he strongly but unsuccessfully opposed. He died in 1654.

Ox-eye. See *Chrysanthemum.*

Oxford, a city and county borough in England, capital of Oxford county, and seat of one of the most celebrated universities in the world, is situated about 50 miles W.N.W. London, on a gentle acclivity between the Cherwell and the Thames, here called the Isis. Oxford, as a city of towers and spires, of fine collegiate buildings old and new, of gardens, groves, and avenues of trees, is unique in England. The oldest building is the castle keep, built in the time of William the Conqueror and still all but entire. Of the numerous churches the first place is due to the cathedral, begun about 1160, and chiefly in the late Norman style. It not only serves as the cathedral of Oxford diocese, but also forms part of the collegiate buildings of Christ Church, of which institution the dean of Oxford is always head. Other churches are St. Mary's, used as the University Church, with a noteworthy tower and spire (dating about 1400), St. Philip and St. James's, a striking example of modern Gothic; All Saints' (18th century), with a Græco-Gothic spire; St. Giles's (12th and 13th century); St. Barnabas, a fine modern building. Of the university buildings the most remarkable are Christ's Church, the largest and grandest of all the colleges, with a fine quadrangle and other buildings, a noble avenue of trees (the Broad Walk), the cathedral serving as its chapel; Magdalen College, considered to be the most beautiful and complete of all; Balliol College, with a modern front (1867–69) and a modern Gothic chapel; Brasenose College; and New College (more than 500 years old), largely consisting of the original buildings, and especially noted for its gardens and cloisters; besides the Sheldonian Theatre, a public hall of the university; the new examination schools, new museum, Bodleian Library, Radcliffe Library, and other buildings belonging to the university. (See *Oxford University.*) Oxford depends mostly on the university, and on its attractions as a place of residence. It sends one member to parliament. Pop. in 1881, 40,837; in 1891 was 45,741.—The county is bounded by Northampton, Warwick, Gloucester, Berks, and Buckingham; area, 483,621 acres, of which more than five-sixths are under crops or in grass. The south part of the county presents alternations of hill and dale, the former, particularly the Chiltern Hills, being beautifully varied with fine woods, tracts of arable land, and open sheep downs. The central parts are more level, and are also adorned by numerous woods. In the north and west the country presents a less pleasing aspect. Much of the soil is well adapted for the growth of green crops and barley. The grass-lands are also rich and extensive, dairy husbandry is largely practised, and great quantities of butter are made. Manufactures are of little importance. The principal rivers are the Thames or Isis, Thame, Evenlode, Cherwell, and Windrush. The county returns three members to parliament. Pop. 185,938.

Oxford, LORD. See *Harley.*

Oxford Clay, in geology, a bed of dark-blue or blackish clay, interposed between the Lower and Middle Oolites, so called from its being well developed in Oxfordshire. It sometimes attains a thickness of from 200 to 500 feet, and abounds in beautifully preserved fossil shells of belemnites, ammonites, &c.

Oxford University, one of the two great English universities, established in the middle ages, and situated in the city of Oxford (which see). Like Cambridge it embraces a number of colleges forming distinct corporations, of which the oldest is believed to be University College, dating from 1253, though Merton College was the first to adopt the collegiate system proper. The following list contains the name of the colleges, with the time when each was founded:—

1.	University College,	1253
2.	Balliol College,	1268
3.	Merton College,	1274
4.	Exeter College,	1314
5.	Oriel College,	1326
6.	Queen's College,	1340
7.	New College,	1379
8.	Lincoln College,	1427
9.	All Souls' College,	1437
10.	Magdalen College,	1458
11.	Brasenose College,	1509
12.	Corpus Christi College,	1516
13.	Christ Church College,	1546
14.	Trinity College,	1554
15.	St. John's College,	1555
16.	Jesus College,	1571
17.	Wadham College,	1612
18.	Pembroke College,	1624
19.	Worcester College,	1714
20.	Keble College,	1870
21.	Hertford College,	1874

There are also two 'Halls,' St. Mary Hall and St. Edmund Hall, which are similar institutions, but differ from the colleges in not being corporate bodies.

Oxford University is an institution of

quite the same character as that of Cambridge. (See *Cambridge, University of.*) Most of the students belong to and reside in some college (or hall), but since 1869 a certain number have been admitted without belonging to any of these institutions. The students receive most of their instruction from tutors attached to the individual colleges, and those of each college dine together in the college hall and attend the college chapel. The ordinary students are called 'commoners.' The style or title by which the corporation is known is The Chancellor, Masters, and Scholars of the University of Oxford. The head of the university is the chancellor. The chief governing bodies are the House of Convocation, the Congregation of the university, and the Hebdomadal Council. The House of Convocation, which includes all Doctors and Masters whose names are on the register, elects to nearly all the offices in the gift of the university; gives the final sanction to all new statutes; transacts nearly all the formal business of the university as a corporate body, and elects the parliamentary representatives. The Congregation of the University, which includes professors and other officials and all resident members of Convocation, can amend, confirm, or reject legislative proposals laid before it, but all these must originate with the Hebdomadal Council, which consists of about twenty members, partly official, but mostly elected, and which meets every week in term time. The office of chancellor is almost purely honorary, the vice-chancellor is in fact the supreme executive and judicial authority of the university. Two proctors are chosen yearly to maintain the discipline of the university. The university is open without respect of birth, age, or creed, to all who have passed the necessary examinations or other tests. Students enter as commoners or as 'scholars' or 'exhibitioners,' according as they obtain some of the numerous scholarships or exhibitions which may be competed for. There are four terms or periods of study, known as Michaelmas, Hilary or Lent, Easter, and Trinity or Act. The two latter have no interval between them, so that the terms of residence are three of about eight weeks each. The degrees conferred are those of Bachelor and Master in Arts, and Bachelor and Doctor in Music, Medicine, Civil Law, and Divinity. Twelve terms of residence are required for the ordinary degree of B.A. No further residence is necessary for any degree, and no residence whatever is required for degrees in music. Candidates for the degree of B.A. must pass three distinct examinations: Responsions (known among undergraduates as the 'Little Go' or 'Smalls') before the masters of the schools; first public examination before the moderators ('Moderations'); and the second public examination before the public examiners ('Greats'). If the student wishes to take his degree with 'honours' a residence of four years is usually necessary. Honours may be taken in *literæ humaniores* (classics, ancient history, and philosophy), mathematics, jurisprudence, modern history, theology, natural science, and oriental studies. Any B.A. may proceed to the degree of M.A. without further examination or exercise, in the twenty-seventh term from his matriculation, provided he has kept his name on the books of some college or hall, or upon the register of unattached students for a period of twenty-six terms. In the case of all other degrees (except honorary ones) some examination or exercise is necessary. Women were admitted to the examinations in 1884, but do not receive degrees. Three colleges for women have been established: Somerville Hall, Lady Margaret Hall, and St. Hugh's Hall. Mansfield College, for the education of men for the nonconformist ministry, was established in 1888. The total number of students is about 3000. The total number of professorships, &c., in the university is about fifty. The total annual revenues are between £400,000 and £500,000. The institutions connected with the university include: the Bodleian Library (the second in the kingdom), the Ashmolean Museum, Botanic Gardens, Taylor Institution for modern languages, University Museum, Radcliffe Library, Observatory, and Indian Institute. Affiliated Colleges are: St. David's College, Lampeter (1880); University College, Nottingham (1882); and Firth College, Sheffield (1886). The university sends two members to parliament.

Oxides, the compounds of oxygen with one other element; thus hydrogen and oxygen form *oxide of hydrogen* or *hydrogen oxide*, oxygen and chlorine form a series of *oxides of chlorine*, oxygen and copper form *oxide of copper* or *copper oxide*, and so on. When two oxides of the same element exist, the name of that which contains the greater proportion of oxygen ends in *ic*, while the name of the oxide containing less oxygen ends in *-ous;* thus we have N_2O, called

nitrous oxide, and N_2O_3, called *nitric oxide*. If there be several oxides they may be distinguished by such prefixes as *hypo*, *per*, &c., or by the more exact prefixes *mono*, *di*, *tri*, *tetra*, &c. For the different oxides see the articles on the individual chemical elements.

Oxlip (*Primula elatior*), a kind of primrose, so called from some resemblance in the flowers to the lips of an ox, and intermediate between the primrose and cowslip.

Ox-peckers, a name for certain African birds, also known as *Beef-eaters* (which see).

Oxus, Amoo, Amoo-Daria, or Jihoon, a large river in Central Asia, which has its sources between the Thian Shan and Hindu Kush ranges in the elevated region known as the Pamir, flows W. through a broad valley, receiving many affluents, and N.W. through the deserts of western Turkestan, bordering on or belonging to Bokhara and Khiva, to the southern extremity of the Sea of Aral, where it forms an extensive marshy delta. It is generally held that the lower part of the course of the Oxus was at one time different from what it is now, and that the river entered the Caspian Sea. The principal head-stream of the Oxus is by some considered to be the Panja River, which rises in a lake of the Great Pamir, at a height of 13,900 feet. The Oxus for a considerable distance forms the boundary between Afghanistan and Bokhara. Total course, 1300 miles.

Oxychlo'ride, a compound of a metallic oxide with a chloride; as, oxychloride of iron.

Oxycoc'cus, a genus of plants of the natural order Vacciniaceæ, commonly known as the cranberry (which see).

Oxyflu'oride, a compound of an oxide with a fluoride; as, the oxyfluoride of lead.

Oxygen, a gas which is the most widely distributed of all the elements. Eight-ninths by weight of water, one-fourth of air, and about one-half of silica, chalk, and alumina consist of oxygen. It enters into the constitution of nearly all the important rocks and minerals; it exists in the tissues and blood of animals; without it we could not live, and by its agency disintegration of the animal frame is carried on after death. All processes of respiration are carried on through the agency of oxygen, all ordinary processes of burning and of producing light are possible only in the presence of this gas. Oxygen was first isolated in 1774 by Joseph Priestley, who gave to the new gas which he had discovered the name of *dephlogisticated air*. Lavoisier, the year following Priestley's discovery, put forward the opinion that the new gas was identical with the substance which exists in common air, and gave it the name oxygen—from the Greek *oxys*, acid, and root *gen* to produce—because he supposed that it was present as the active constituent in all acids; modern experiments, however, prove that it is not necessary in all cases to acidity or combustion. Oxygen is invisible, inodorous, and tasteless; it is the least refractive, but the most magnetic of all the gases; it is rather heavier than air, having a specific gravity of 1·1056, referred to air as 1·00; it is soluble in water to the extent of about three volumes in 100 volumes of water at ordinary temperatures. Oxygen was liquefied for the first time in 1877 by the application of intense cold and pressure; it has even been solidified. It is possessed of very marked chemical activity, having a powerful attraction for most of the simple substances, the act of combining with which is called oxidation. Some substances when brought into contact with this gas unite with it so violently as to produce light and heat; in other cases oxidation is much more gradual, as in the rusting of metals. The presence of oxygen is, so far as we know, one of the physical conditions of life. In inspiring we receive into the lungs a supply of oxygen: this oxygen is carried by the blood to the various parts of the body, and there deposited to do its work of tissue-forming, &c.; the deoxygenated blood returns to the lungs, and again receives a fresh supply of the necessary oxygen. Trees and plants evolve oxygen, which is formed by the decomposition of the carbonic acid absorbed by the leaves from the atmosphere. This is due to the action of the sun's rays and the chlorophyll or green colouring matter of the leaves. When oxygen unites with another element the product is called an *oxide*. The oxides form a most important series of chemical compounds (see *Oxides* and the articles on the various chemical elements). The power of supporting combustion is one of the leading features of oxygen, and until the discovery of oxygen no well-founded explanation of the facts of combustion was known. Oxygen exists in another form different from that of the ordinary gas; in this form it exhibits many marked peculiarities. See *Ozone*.

Oxyhydrogen Blowpipe. See *Blowpipe*.

Oxyhydrogen Light, or Lime-light, a brilliant light produced when a jet of mixed oxygen and hydrogen gas is ignited and

directed on a solid piece of lime. It is commonly used in magic lantern exhibitions; and the two gases are kept in separate air-tight bags, or iron cylinders into which the gas is forced under very high pressure. From these receptacles tubes conduct the gases to meet in a common jet.

Oxyhydrogen Microscope, one in which the object is illuminated by means of the oxyhydrogen light, and a magnified image of it thrown on a screen.

Oxym'oron, in rhetoric, a figure in which an epithet of quite contrary signification is added to a word; as, cruel kindness.

Oxyrhynchus (-rin'kus), a celebrated Egyptian fish, sacred to the goddess Athor, and represented in sculptures and on coins. It was anciently embalmed.

Oxyr'ia, a genus of plants of the natural order Polygonaceæ. *O. reniformis* (mountain-sorrel) is found on the summits of the White Mountains, and north to the Arctic Sea.

Oxysalts, in chemistry, those salts which contain oxygen. The oxysalts form a very important series of substances; among them are included all the sulphates, nitrates, oxides, hydrates, chlorates, carbonates, borates, silicates, &c.

Oxysulphide, a compound formed by the combination of sulphur and oxygen with a metal or other element. The oxysulphides are not very numerous or important.

Oxyu'ris, a genus of internal parasitic thread-worms, which rapidly multiply and pass from the intestine to other organs. *O. vermiculāris*, often found in the human rectum, is usually about a quarter of an inch long.

Oyer and Terminer (Law). The name of courts of criminal jurisdiction in the United States, generally held at the same time with the Court of Quarter Sessions, and by the same judges, and which have power, as the terms imply, *to hear and determine* all treasons, felonies, and misdemeanours committed within their jurisdiction. The terms Oyer and Terminer are derived from the Old French.

Oyster, an edible mollusc, one of the Lamellibranchiate Mollusca, and a near ally of the mussels, &c. It belongs to the genus *Ostræa*, family *Ostræidæ*, the members of which are distinguished by the possession of an inequivalve shell, the one half or valve being larger than the other. The shell may be free, or attached to fixed objects, or may be simply imbedded in the mud. The foot is small and rudimentary, or may be wanting. A single (adductor) muscle for closing the shell is developed. The common oyster (*Ostræa edūlis*) is the most familiar member of the genus. The fry or fertilized ova of the oyster are termed 'spat,' and enormous numbers of ova are produced by each individual from May or June to September—the spawning season. The spat being discharged, each embryo is found to consist of a little body inclosed within a minute but perfectly formed shell, and possessing vibratile filaments or cilia, by which the young animal at first swims freely about, and then attaches itself to some object. In about three years it attains its full growth. The oysters congregate together in their attached state to form large submarine tracts or 'oyster-beds,' as they are termed. In England the Gravesend beds, and those extending along the coasts of Kent and Essex, are celebrated; in Scotland the beds in the Firth of Forth; in France, those of Rochelle, Rochefort, Ré and Oléron, Cancale, and Granville; in Denmark the Schleswig beds and those at the north point of Jutland; in America the beds of Virginia, of Georgia, and of Long Island. The most common American species is *O. virginiāna*, which is found on the Atlantic coast from the Gulf of St. Lawrence to the Gulf of Mexico. The most favourable bottom and locality for oyster-beds appear to be those situated in parts where the currents are not too strong, and where the sea-bed is shelving, and covered by mud and gravel deposits.

The United States and France are the chief seats of the oyster industry. In the United States the natural oyster-beds are still a source of great wealth, while in Europe the native beds have long since been practically destroyed. Large quantities of American oysters are now sent to Europe; and the American are generally larger than the European. In Europe the oyster industry is rapidly ceasing to be oyster fishery and becoming oyster culture. The most elaborate system of oyster culture is that practised at Arcachon in France and on the island of Hayling, near Portsmouth in England. In the breeding season the young oysters are collected upon tiles or hurdles, and laid down in artificial ponds or troughs, where they are kept until they are sent to market. In Scotland the oyster has hitherto been left pretty much to itself and to nature; hence the depopulation of the once famous

beds of the Firth of Forth, and the fact that the 'Pandores' of Prestonpans are things of the past. In England, and especially in the Thames estuary, brood oysters are laid down in fattening beds, where they obtain food which gives them a peculiar thinness of shell and delicacy of flavour, and that green colour which is so much esteemed by epicures. The oysters thus laid down and bred in these situations are known as 'natives,' and fetch the highest price in the market. Oyster culture is prosecuted on various parts of the coast, chiefly by private companies. The most ancient of these is the Whitstable company, which has worked its present ground on the south side of the entrance to the Thames from time immemorial. In Britain oyster-beds, being below the medium line of the tides, belong by right to the crown, and can only be claimed as private property in virtue of a royal grant. In order to prevent the total extirpation or great diminution of the supply of oysters a close season has been fixed, by a convention between England and France, applying to the seas between the two countries. The close season lasts from the 1st of May to the 31st of August. The pearl oyster (*Meleagrina margaritifera*), of the Indian and Pacific Oceans, belongs to a different family.

Oyster-catcher (*Hæmatopus ostralegus*), a bird belonging to the order of Grallatores or Wading Birds, nearly allied to the plovers (Charadriidæ), and popularly known as the 'sea-pie.' It is distinguished by its long, thin, wedge-shaped, orange-coloured bill, and its black and white plumage. It is a permanent resident in Britain, and frequents the sea-coast, where it feeds on Mollusca.

Ozæ'na, a fetid ulcer in the nostril, which often follows scarlatina, or even a severe cold, but which may be a symptom of cancer or other similar disease.

Oza'ka. See *Osaka.*

O'zark Mountains, a chain of the U. States, intersecting in a south-west direction the states of Missouri and Arkansas; height about 1400 feet.

Ozieri, a town in Sardinia, province of Sassari, the seat of a bishop. Pop. 8413.

Ozo'kerite, a fossil resin of a pleasantly aromatic odour, existing in the bituminous sand-stones of the coal measures, and occurring chiefly in Galicia, in Austria. Small quantities of it have been found at Uphall in Linlithgowshire, and at Urpeth Colliery, Newcastle-on-Tyne, and various other places. It contains carbon and hydrogen in the proportion of 86 per cent of the former to 14 per cent of the latter. When purified it forms a hard paraffin, from which excellent candles are manufactured. It is used to some extent as an adulterant of bees'-wax.

Ozone, a modified—technically an *allotropic*—form of oxygen. Two volumes of ozone contain three volumes of oxygen condensed to two volumes; the formula of ozone is therefore O_3. Ozone exists in small quantities in pure country air, and is produced in various ways. When an electric machine is set in operation a peculiar smell may be perceived; after a discharge of lightning the same smell is perceptible. The substance which manifests this odour is ozone (from Greek *ozō*, I smell), and in each of those cases ozone is produced. Ozone acts as a very powerful oxidizer; for this reason it is of great service in the atmosphere, as it so readily oxidizes, and thus renders comparatively unhurtful, animal effluvia and other obnoxious products of animal or vegetable decomposition. Ozone rapidly bleaches indigo, converting it into a white substance called isatin, which contains more oxygen than the indigo itself.

P.

P, the sixteenth letter and twelfth consonant in the English alphabet. It is one of the mutes and labials, and represents a sound produced by closely compressing the lips till the breath is collected, and then letting it issue. See *B.*

Pabna', chief town of district of same name, Bengal, on the river Ichamati; contains the usual public buildings and a large indigo factory. Pop. 15,267.—The district forms the south-east corner of the Rajshahi Division, and is bordered on the east by the Brahmaputra, and on its south-west frontier by the Ganges. Area, 1847 square miles; pop. 1,311,728.

Paca (*Cœlogenys*), a genus of rodents allied to the capybaras, cavies, and agoutis. The common paca (*C. paca*) is one of the largest of the rodents, being about 2 feet long and about 1 foot high. In form it is thick and

clumsy, and the tail is rudimentary. In habits the pacas are chiefly nocturnal and herbivorous. They excavate burrows, run

Common Paca (*Cœlogenys paca*).

swiftly, and swim and dive with facility. They are found in the eastern portion of South America, from Paraguay to Surinam. The flesh is said to be savoury.

Pacay', a Peruvian tree (*Prosōpis dulcis*), natural order Leguminosæ, sub-order Mimosæ. The pure white, flaky matter in which the seeds are embedded is used as food, and the pods, which are nearly two feet long, serve for feeding cattle. The mesquite (which see) belongs to the same genus.

Pace, a measure of length, used as a unit for long distances. It is derived from the Latin *passus*, which was, however, a different measure, the Latin *passus* being measured from the mark of the heel of one foot to the heel of the same foot when it next touched the ground, thus stretching over two steps; while the English pace is measured from heel to heel in a single step. The Latin pace was somewhat less than 5 feet; the English military pace at the ordinary marching rate is $2\frac{1}{2}$ feet, and at double quick time 3 feet.

Pacha. See *Pasha.*

Pacheco (pà-chā'kō), Francisco, Spanish painter, born at Seville in 1571, died 1654. He was the pupil of Luis Fernandez, and the instructor of Velasquez, who became his son-in-law. In his own time he attained great popularity. Of his numerous portraits those of his wife and of Cervantes were the most admired. Pacheco was the author of a treatise on the Art of Painting.

Pachira (pa-kī'ra), a genus of tropical American trees allied to the baobab-tree, The largest flowered species, *P. macrantha*, found in Brazil, attains a height of 100 feet, and has flowers 15 inches long. The plants are familiar in our hothouses under the name of *Carolinea.*

Pacho'mius, a scholar of St. Antony, was the first who introduced, instead of the free hermit life, the regular association of monks living in cloisters, having founded one of them on Tabenna, an island of the Nile, about 340 A.D. He was also the founder of the first nunnery, and at his death is said to have had the oversight of above 7000 monks and nuns.

Pachuca (pà-chö'kà), a town of Mexico, capital of the state Hidalgo, in a rich silver-mining region, about 8200 feet above the sea. Pop. 1890, 25,000.

Pachyder'mata, the name formerly applied to the division or order of Mammalia, including the elephants, tapirs, hippopotamus, rhinoceros, swine, and hyrax—all of which forms were distinguished by their thick skin, by their non-ruminant habits, and by their possessing more than one hoof on each leg. The group is now divided among the various sub-orders of the Ungulata. See *Ungulata.*

Pachyglossæ, a section of saurian reptiles having a thick fleshy tongue, convex, with a slight nick at the end. It includes the iguanas and agamas.

Pachyrhizus (pak-i-rī'zus), a genus of tropical leguminous plants common to both hemispheres. *P. angulatus* has fleshy roots of great length and thickness, which are used in times of scarcity as an article of diet.

Pacific Ocean (formerly called also the *South Sea*), that immense expanse of water which extends between the North and South American continents and Asia and Australia. It is the largest of the oceans, exceeding in compass the whole of the four continents taken together, and occupying more than a fourth part of the earth's area, and fully one-half of its water surface. On the west it extends to the Indian Ocean, and has several more or less distinct seas connected with it—the China Sea, Yellow Sea, Sea of Japan, Sea of Okhotsk, &c.; on the north it communicates with the Arctic Ocean by Behring's Straits, on the south it is bounded by the Antarctic Ocean, and on the east it joins the Atlantic at Cape Horn. Within this enormous circumference it includes the numerous islands composing the groups of Australasia and Polynesia, and those adjoining America and Asia. The average depth of the Pacific appears to be greater than that of the Atlantic, and its bed more uniform. Recent soundings to the south of the Friendly Islands give a depth of from 4295 to 4430 fathoms (about five miles). The deepest soundings known are 4475 fathoms S. of the Ladrone Islands, and 4655 fathoms N.E. of Japan. (See *Ocean.*) In the Pacific the tides never attain

the maximum heights for which some parts of the Atlantic and Indian Oceans are celebrated. On all the west coast of America the rise of the tide is usually below 10 feet, and only in the Bay of Panamá does it vary from 13 feet to 15 feet. The trade-winds of the Pacific are not so regular in their limits as those of the Atlantic, and this irregularity extends over a much wider region in the case of the south-east trade-wind than in the case of the north-east. The cause of this is the greater number of islands in the South Pacific Ocean, which, especially in the hot season, disturb the uniformity of atmospheric pressure by local condensations. The north-east trade-wind remains the whole year through within the northern hemisphere. The south-east trade-wind, on the other hand, advances beyond the equator, both in summer and winter, still preserving its original direction. In the region stretching from New Guinea and the Solomon Islands south-eastwards, there are no regular winds. The zones of the two trade-winds are separated by regions of calms and of light winds, the limits of which vary of course with the varying limits of these zones. In the Chinese seas the terrible typhoon occasionally rages, and may occur at any season of the year. As to the chief currents of the Pacific see *Currents, Marine.* The Portuguese were the first Europeans who entered the Pacific, which they did from the east. Balboa, in 1513, discovered it from the summit of the mountains which traverse the Isthmus of Darien. Magellan sailed across it from east to west in 1520–21. Drake, Tasman, Behring, Anson, Byron, Bougainville, Cook, Vancouver, Lapérouse, and others, traversed it in different directions in the 17th and 18th centuries.

Pacinian Corpuscles, in anatomy, minute oval bodies appended to the extremities of certain nerves, especially those of the hands and feet, probably connected with the sense of touch; named after an Italian anatomist.

Packer, Asa, capitalist and philanthropist, was born in Groton, Conn., in 1806. He was member of Pennsylvania Legislature, county judge, projector of the Lehigh Valley R. R. He became the richest man in Pennsylvania. He served two terms in Congress. Lehigh University was liberally endowed by him. He died in 1879.

Pack'fong, a Chinese alloy of a silver-white colour, consisting (though different accounts are given of its composition) of copper, zinc, nickel, and iron. It was formerly used by watch-makers, mathematical instrument makers, and others, for a variety of purposes for which nickel alloys are now employed.

Pack-ice, in the Arctic Seas, an immense assemblage of large floating pieces of ice. When the pieces are in contact the pack is said to be *closed;* when they do not touch, though very near each other, it is said to be *open.*

Paco. See *Llama.*

Pacto'lus, in ancient times the name of a small river of Lydia, celebrated for its golden sand. It is now called *Sarabat.*

Pactum Illicitum, in Scotch law, an unlawful contract, whether it be directly illegal, *contra bonos mores,* or inconsistent with the principles of sound policy.

Pacu'vius, Marcus, ancient Roman tragic poet, born at Brundusium in 219 B.C., passed the greater part of his life at Rome, where he became famous both for his poetry and his paintings, retired to Tarentum during his last years, and died at the age of ninety in 129 B.C. Only fragments of his tragedies exist.

Padang', a town in Sumatra, capital of a residency of the same name, and seat of the Dutch government of the West Coast, is the chief market in Sumatra for coffee and gold. The town embraces a Chinese settlement and a European quarter. Pop. 15,000.

Paddle, a kind of oar used in propelling and steering canoes and boats by a vertical motion. It is shorter and broader in the blade than the common oar, and is used without any fulcrum on the edge of the boat. The boatmen sit with their faces looking in the direction in which the boat moves, and propel the boat by dipping the blade of the paddle in the water and pushing backwards. When there is only one boatman a paddle with two blades connected by a common handle is used.

Paddle-fish, the *Polyŏdon spatŭla,* a large fish allied to the sturgeons, so named from the elongated broad snout with which it stirs up the soft muddy bottom in search of food. It often reaches a length of from 5 to 6 feet. The paddle-fishes are exclusively North American in their distribution, being found in the Mississippi, Ohio, and other great rivers of that continent.

Paddle-wheel, in steam-ships one of the wheels (generally two in number, one placed on each side of the vessel) provided with boards or floats on their circumferences, and driven by the engine for the ship's propulsion

through the water. On rivers liable to such obstructions as floating trees, &c., a single paddle-wheel placed at the stern of the vessel is employed. The ship is propelled by the reaction of the water upon the floats. Most power is gained when the floats are vertical, passing through the water perpendicular to the direction of greatest pressure. The paddle-wheel is now almost entirely confined to river-boats; in ocean-going steamers it has given place to the screw.

Paddy, a Malayan word universally adopted in the East Indies for rice in the husk, whether in the field or gathered.

Padel'la (Italian, a frying-pan), a shallow vessel used in illuminations. A number of them are partially filled with some kind of grease, in the middle of which is placed a wick, and are then placed so as to bring out when lighted the outlines of a building or the slope of a rising ground.

Pa'derborn, an ancient town in Prussia, province of Westphalia, 50 miles south-east of Münster. It is the see of a Roman Catholic bishop, and has a fine old cathedral, part of which dates from the 11th century. The manufactures are unimportant, but there is a considerable trade. Pop. 16,624.

Pad'iham, a town in Lancashire, England, 4 miles west of Burnley; has manufactures of cotton, and in the vicinity coal-mines and stone-quarries. Pop. 1891, 11,311.

Padilla (på-*dēl'yä*), JUAN LOPEZ DE, a popular Spanish hero, born in 1484, of a noble family in Toledo, was a leader in the insurrection of the Castilian towns (the so-called Communidades) against the arbitrary policy and Flemish advisers of Charles V. The fate of the insurrection was decided by the battle of Villalar, in which Padilla was wounded and taken prisoner. He was executed on the following day (April 24, 1521). His wife, Maria Pacheco, defended Toledo for some time after his death, and on its fall fled to Portugal. The names of Padilla and his wife are still household words among the Castilians.

Padishah', a title assumed by the Turkish Sultan and Persian Shah, derived from *pad* (protector or throne), and *shah* (king, prince).

Pad'stow, a seaport in Cornwall, England, on the estuary of the Camel, 12 miles N.W. of Bodmin. It is a very ancient place, and furnished ships for the siege of Calais in 1346. Pop. 1749.

Pad'ua (Italian, *Padŭa;* Latin, *Patavium*), a city in Italy, capital of the province of the same name, 22 miles west of Venice, on a low flat on the Bacchiglione, which flows through it in several branches and is crossed by numerous bridges. The houses are lofty, the streets narrow, and several of these, as well as some of the squares, are lined with mediæval arcades. Of recent times the town has been improved by the opening up of new and the widening of old streets. The buildings most deserving of notice are the town-house or Palazzo della Ragione, an immense pile erected between 1172 and 1219, extending along the market-place, standing upon open arches, with a lofty roof, said to be the largest in the world unsupported by pillars, and containing a large hall, adorned with mural paintings; the large mosque-like church of St. Antonio, called Il Santo, begun about the year 1230 and finished in the following century; the church of the Annunziata, the walls of which are covered with well-preserved paintings by Giotto, &c. The university, said to have been founded by the Emperor Frederick II. in 1238, was long renowned as the chief seat of law and medicine in Italy; and very many names famous in learning and art are connected with Padua, such as Galileo, Scaliger, Tasso, Giotto, Lippo Lippi, and Donatello. Padua is the see of a bishop. Under the Romans it was a flourishing municipal town, and its history follows the course of events common to most of the cities of Italy on the decline and fall of the Roman Empire. Latterly it was under the domination of Venice, whose fortunes it followed until 1866, when, with Venice, it became part of the kingdom of Italy. Pop. 47,334. —The province of Padua has an area of 854 square miles, and pop. 1891, of 434,322.

Padu'cah, a town in the United States, in M'Cracken county, Kentucky, on the Ohio, not far from the mouth of the Tennessee. Pop. 1890, 12,797.

Pad'ula, a town of S. Italy, prov. Salerno. Pop. 7874.

Pæan, in Greek, a hymn to Apollo or to other deities, or a song in praise of heroes. A pæan was sung, previous to battle, in honour of Ares (Mars), and after a victory, in praise of Apollo.

Pædobaptists. See *Baptists.*

Pæ'ony. See *Peony.*

Pæstum (Greek, *Posidonia*), an ancient Greek city of Lower Italy, on the Gulf of Salerno. It is celebrated by the Latin poets for the fragrance of its twice-blowing roses, and its mild and balmy air. Little

new remains of it but some fragments of its walls and the well-preserved ruins of two Doric temples of extreme interest. The city was settled by a Greek colony from Sybaris B.C. 524.

Paez (pā-eth′), JOSÉ ANTONIO, one of the founders of South American independence, born of Indian parents near Acarigua, Venezuela, in 1790, entered the patriot army in 1810, rose to general of division in 1819, and took a leading part in the battle of Carabobo, which secured the independence of Colombia in 1821. At first he acted in concert with Bolivar, but in 1829 he placed himself at the head of the revolution which culminated in the independence of Venezuela, of which he was the first president. He died in exile at New York in 1873.

Paganí′ni, NICCOLÒ, a celebrated violinist, born in 1784 at Genoa, died at Nice 1840. His father, who had some knowledge of music, and discerned the talents of his son, put him at a very early age under the best masters (Costa, Rolla, Paer) to learn music, and particularly the violin. With this instrument his progress was so rapid that at the age of nine he was able to perform in public at Genoa. His first engagement was in 1805, at Lucca, where he found a patroness in Princess Eliza, Bonaparte's sister. In 1813 he left Lucca for Milan, and in 1828 visited Vienna. From this period his fame was world-wide. The wonder which he excited was caused not merely by the charm of his execution and his extraordinary skill, but also by his external appearance, which had something weird and even demoniacal in it. After visiting almost all the great towns of Germany he made a musical tour through France and Great Britain, realizing immense gains. His last years were spent at a villa near Parma.

Pagans, the worshippers of many gods, the heathen; so called by the Christians because after Christianity had become predominant in the towns the ancient polytheistic faith still lingered in the villages (*pagi*) and country districts.

Page, a youth retained in the family of a prince or great personage as an honourable servant, to attend in visits of ceremony, carry messages, bear up trains, robes, &c. In the United States pages are the errand-boys in Congress.

Paging-machine, a machine for printing consecutive numbers on the pages of a book, bank-notes and cheques, railway-tickets, &c. Several machines of this kind have been invented, all of which consist essentially of a number of revolving discs bearing the ten digits in raised figures on their circumference, with various contrivances for making the first disc describe one-tenth of a revolution after every figure is printed, for making the second disc describe one-tenth of a revolution every time the first makes a complete revolution, and so on, as well as for supplying the figures with ink at each impression. Provision is also made for the printing of duplicate and alternate numbers if this is required.

Pago, an Austrian island in the Adriatic, on the coast of Dalmatia; area, 81 sq. miles. Pop. 5781.

Pago′da, the name given to Hindu and Buddhist temples. The temple proper is generally of pyramidal form, and of a number of stories, of great size and height, and

Great Pagoda at Bhuvaneswar, Orissa, India.—Fergusson.

embellished with extraordinary splendour. Connected with it may be various other structures, open courts, &c., the whole forming architecturally a very imposing group. Pagodas are numerous not only in Hindustan but also in Burmah, Siam, and China. The statues in the temples are often of a colossal size.

Pagu′ma, a group of mammals, genus *Paradoxūrus*, family Viverridæ (civets and genets), inhabiting Eastern Asia. The peculiar masked paguma (*P. larvātus*) has a white streak down the forehead and nose, and a white circle round the eyes, which give it the appearance of wearing an artificial mask.

Pagu'rus, the genus of Crustaceans to which the hermit or soldier-crabs belong. See *Hermit-crab.*

Pahang', a state on the east coast of the Malay Peninsula; area, 3500 sq. m.; pop. 20,000. By the treaty concluded between Great Britain and the Sultan of Pahang in 1888 the control of the foreign relations of that state was conveyed to the government of the Straits Settlements; and Pahang is now practically a dependency of that colony.

Pahlanpur, or PALANPUR, a town in India, presidency of Bombay, province of Gujerat, the capital of a small Mohammedan state tributary to the Guicowar of Baroda, and the head-quarters of Pahlanpur Political Agency, which includes a group of thirteen Native States in the Bombay Presidency, under the political superintendence of the Bombay government. Pop. of town, 17,547; of state, 234,402; of agency, 576,478.

Pahlavi. See *Pehlevi.*

Paignton (pān'tun), a coast town in Devon, England, on Tor Bay, 2 miles S. of Torquay, is a rapidly-growing watering-place, and has large manufactures of cider. Pop. 5092.

Pain, an uneasy sensation of body, resulting from particular impressions made on the extremities of the nerves transmitted to the brain. Physical pain may be produced by various causes—by injuries to the organs in which the pain is localized; by a peculiar state of the brain and nerves; or by the sympathetic affection of an organ at some distance from that which has been injured. It is often of great service in aiding the physician at arriving at a correct diagnosis of a disease, and still more obviously in frequently being the only intimation which a patient has of the fact of there being a disease which demands a remedy.

Paine, ROBERT TREAT, signer of the Declaration of Independence, was born in Boston, Mass., in 1731. He was delegate to Provincial and Continental Congresses. He held offices of Attorney-general of Massachusetts and Judge of Supreme Court; was an able judge. He died in 1814.

Paine, THOMAS, political and deistical writer, born in 1737 at Thetford, England. In 1774 emigrated to America, with a letter from Franklin. Paine threw himself heart and soul into the cause of the colonists, and his pamphlet entitled Common Sense, written to recommend the separation of the colonies from Great Britain, and his subsequent periodical called the Crisis, gave him a title to be considered one of the founders of American independence. In 1787 he returned to England, and in answer to Burke's Reflections on the French Revolution wrote his Rights of Man. A prosecution was commenced against him as the author of that work, but while the trial was pending he was chosen member of the national convention for the department of Calais, and, making his escape, set off for France, where his Rights of Man had gained him great popularity, and arrived there in September, 1792. On the trial of Louis XVI. he voted against the sentence of death, proposing his imprisonment during the war and his banishment afterwards. This conduct offended the Jacobins, and towards the close of 1793 he was excluded from the convention, arrested, and committed to prison, where he lay for ten months, escaping the guillotine by an accident. Just before his confinement he had finished the first part of his work against revelation, entitled the Age of Reason; it was published in London and Paris in 1794, by which step he forfeited the countenance of the greater part of his American connections. He remained in France till August, 1802, when he embarked for America, where he spent the remainder of his life, occupied with financial questions and mechanical inventions. He died at New York in 1809.

Pains and Penalties, BILL OF. See *Bill.*

Painter's Colic. See *Lead-poisoning.*

Painting is the art of representing the external facts of and objects in nature by means of colour. A study of the art requires a knowledge of form, animate and inanimate; of perspective; and of light and shade. Considered in relation to the subjects treated, painting may be divided into decorative, historical, portrait, *genre* (scenes of common or domestic life), landscape with seascape, architectural, still life. According to the methods employed in the practice of the art it is termed oil, water-colour, fresco, tempera or distemper, and enamel painting, and in mosaics, on glass, porcelain, terra-cotta, and ivory (this last being called miniature-painting). Decorative works, usually in fresco or tempera, but sometimes in oil, are generally executed upon the parts of a building. For the basis of easel pictures, wood panels prepared with a coating of size and white were used solely up to the 14th century for both oil and tempera, and are still sparingly employed; but canvas covered with a priming of size and white-lead, and tightly nailed over a wooden frame called

a 'stretcher,' is now almost universally adopted for oil-painting. For water-colours paper alone is employed. The tools used by an artist are charcoal, coloured crayons, and lead-pencils for outline purposes; colours, a palette for holding the same, a palette-knife for mixing them; brushes for laying them on; and an easel with adjustable heights for holding the canvas. A wooden mannikin, with movable joints, and termed a 'lay-figure,' is sometimes used on which to arrange costumes and draperies.

The term 'oil-colours' is employed to denominate colours ground with oil, and water-colours those wherein gum and glycerine have been employed. Both are ground solid, an oil medium being used in the first case and water in the second to thin out the colours when on the palette. Fresco-painting is executed on wet plaster. Mosaic work is formed by small cubes of coloured glass, called tesseræ, fixed in cement; in tempera the colours are mixed with white; in encaustic, wax is the medium employed; and in enamel the colours are fired. Egyptian, Greek, and early Roman paintings were executed in tempera; Byzantine art found its chief expression in mosaics, though tempera panels were executed; and early Christian art up to and partly including the 14th century adopted this last method. The vehicle employed in mixing the colours was a mixture of gum and white of egg, or the expressed juice of fig-tree shoots. The introduction of oil-painting was long attributed to the Van Eycks of Bruges (circa 1380–1441), but painting in oil is known to have been practised at a much earlier period, and it is now generally held that the invention of the Van Eycks was the discovery of a drying vehicle with which to mix or thin their colours, in place of the slow-drying oil previously in use. This new vehicle was composed of a thickened linseed-oil mixed with a resinous varnish, and it was its introduction that effected so great a revolution in the art of painting. For an account of special methods of painting see articles *Fresco-painting, Mosaic, Tempera, Encaustic, Enamelling,* &c.

History—Egypt and Greece.—The practice of painting extends back to remote ages. It comes first into notice among the Egyptians in the 19th century B.C., the most flourishing period being between 1400 B.C. and 525 B.C. With them the art was the offspring of religion, and was with sculpture, from which it cannot be separated, subordinate to architecture. The productions are found chiefly on the walls of tombs and temples, but also on mummy-cases and rolls of papyrus. They consist chiefly of the representation of public events, sacrificial observances, and the affairs of everyday life. The work is purely conventional in character, and was executed according to a strict canon of rules under the supervision of the priesthood. Both outline and colour were arbitrarily fixed, the figures and objects being rendered in profile and painted in perfectly pure flat tints, with no light or shade. The colours used are very simple, but the effect is often very harmonious, and with a strong sense of decorative composition. Although art is the natural product of man's mind, and cannot be assigned any particular commencement, it is nevertheless doubtless that Egyptian art slightly influenced that of Asia Minor, and strongly so that of Greece, in which country the arts attained to the highest excellence. This is proved by the testimony of historians, for no specimens of true Greek painting save those on vases, have come down to us. In Greece, as in Egypt, painting with sculpture were the handmaidens of architecture, the friezes, pediments, and statues of the temples being originally coloured. The more celebrated of the Greek schools of painting were at Ægina, Sicyon, Corinth, and Athens; the chief masters being Cimon, Polygnotus, and Panœnus, who lived about the 5th century B.C. Apollodorus, same century, systematized a knowledge of light and shade, while Zeuxis and Parrhasius directed their efforts to the perfecting of an ideal human form. Timanthes, a tragic painter, lived in the next generation; and at the time of Alexander the Great appeared Apelles (350 B.C.), the greatest of all Greek portrait-painters, and Protogenes, an animal-painter. With the death of these two painters decline set in, and Greek art gave itself up to the pursuit of trifling and unworthy subjects. Greek painting seems to have been, in truth of effect and in light and shade, in no way inferior to work of the present day, although perspective as a science does not seem to have been practised.

Rome never had in ancient times an art that was indigenous, or produced a painter worthy of note. The conquest of Greece by the Romans brought an influx of Greek artists into Italy, and it was with their hands that the principal works of Roman art were produced. A number of specimens

of ancient paintings have been discovered in the tombs and baths of Rome, at Pompeii, and at other places in Italy, chiefly in fresco and mosaic. Judging from these remains, which are known to have been produced when art was in a state of decadence, the ancients would seem to have possessed a great knowledge of the human figure, of animals, and of inanimate nature, and of their uses in art. Their skill as decorators has scarcely been surpassed. Their colours were used pure with a just treatment of light and shade, and the knowledge of perspective shown, is true, but limited in extent. During the first three centuries after Christ, painting under the new influence of Christianity was practised secretly in the catacombs under and around Rome. But with the establishment of Christianity by Constantine as the religion of the state, pagan art received its death-blow. Christian art was permitted to emerge, and was allowed to adorn its own churches in its own way. Mosaics, missal paintings, and a few panels are all that are left to us of this period. Notwithstanding the efforts made by several of the popes to encourage its growth by withdrawing certain limitations, especially as regards the use of the human figure, art sank lower and lower, until with the flood of barbarism which in the 7th century buried Italian civilization, the art of Christian Rome was practically extinguished.

Byzantium.—Meanwhile with the foundation of Byzantium by Constantine in 330 A.D., a Byzantine school of art had been steadily growing up. As to style, it manifested the old Greek ideals modified by Christianity, and had reached its highest point about the time that Roman art was at its lowest. At Byzantium, art had become Christian sooner and more entirely than at Rome. Like the art of ancient Egypt, however, it had grown, under the strict influence of the priesthood, mechanical and conventional, but was yet strong enough to send artists and teachers through Southern Europe. Their works are still to be seen at Ravenna, in Rome, in Palermo, and more especially in the church of St. Mark at Venice (10th century A.D.). All the Byzantine decorations are in mosaic, and are noteworthy for the splendour of their gilded backgrounds and for their grandeur of conception, though the figure drawing is weak, with no attempt at pure beauty. The Byzantine school was thus the immediate parent of the great schools of Italy, and of the Rhenish or old Cologne school in Germany.

Italy, Early Period.—The Italian painters could not, however, at once free themselves from the Byzantine tradition which compelled one painter to follow in the steps of his predecessor without referring to nature; and so this style was carried on in Italy by Byzantine artists and their Italian imitators up to the middle of the 13th century. The breaking through of this tradition and the great progress made by the arts in the 13th century, form part of a movement which has been termed the Renaissance or Revival, the arts being no longer representative merely, as heretofore, but becoming imitative.

Three cities of Italy, namely, Siena, Pisa, and Florence, share the honours of this revival, each boasting a school, and each possessing two or three great names and their consequent followers. The first regenerators were Guido of Siena, Giunta of Pisa, and Margaritone of Arezzo, whose works, though ugly and almost barbarous, yet show a departure from the stiffness of Byzantine tradition. Giovanni Cimabue, born at Florence in 1240, may, however, be said to be the father of modern painting, and was the first to fairly free himself from traditional models; his works and those of his predecessors just named forming the transition from the Byzantine to the modern manner. His appearance marks an era in history, and after him come two painters, the one at Siena and the other at Florence, in each of whom appears the power of deriving an impression direct from nature. These were Duccio di Buoninsegna (1260–1320), whose masterpiece is still at Siena, and Giotto (1266–1337), a pupil and protégé of Cimabue, and of whose works examples are still to be seen in Florence, at Assisi, and at Padua. Of these two Giotto is by far the greater, and his immediate pupils and their successors constituted a school which exercised an influence throughout Italy. The rival school of Siena produced Simone Memmi (1284–1344), but died out owing to its exclusiveness. The works of all the artists of these two schools were executed either in fresco or in tempera, and although lacking in chiaroscuro and deficient in perspective, compensated largely for these defects by an earnestness, a devotion, and a spiritual significance which will for ever make the 14th century memorable in the history of art. No other

schools worthy of note existed elsewhere in Italy during this century, neither could the Flemish nor the German school be said to have had any distinct existence as such.

With the 15th century came the introduction of oil-painting, and with it an all-round improvement both in knowledge of technics and power of expression. To the earlier half of this century belong the great masters of religious art, the most noteworthy being Fra Angelico (1387–1455), who worked chiefly in Florence, and whose productions are full of the peculiar religious fervour characteristic of the painter. A knowledge of the exact sciences as applied to art gave an added impulse, and Paolo Uccelli (1396–1475) and Piero della Francesca (1415–92) divide the honour belonging to the perfecting of a system of perspective. The works of Masolino da Panicale (died 1420) show the greatest advance yet made in the direction of chiaroscuro. Masaccio (1401–28), by his knowledge of the figure and by his treatment of groups with their proper force of light and shade and relief in appropriate surroundings, became the founder of the modern style. Andrea Verrochio (1432–88), the master of Leonardo da Vinci, promoted a knowledge of anatomy, and Ghirlandajo (1449–98), the master of Michel Angelo, may also be mentioned, both as a goldsmith and as a painter. These painters all belong to the Florentine school, but other schools were co-existent, notably that of Padua founded by Squarcione (1394–1474), whose pupil was Andrea Mantegna (1431–1506), an artist who takes rank among the greatest masters of painting. The Venetian school also arose under the influence of the Bellini, Giovanni (1427–1516) and his brother Gentile (1429–1507), whose works, though somewhat hard and somewhat dry in texture, yet in colour anticipate the great works of their pupils. The Umbrian school produced Pietro Perugino (1446–1524), a painter of the first rank and the master of Raphael. The Neapolitan school also began to be heard of. The Italian art work of the 15th century by its unconsciousness and spiritual meaning excelled much of that which was to follow. The latter, though carried to the highest pitch of perfection, lost much of the freshness and spontaneity possessed by the art of the earlier century.

Netherlands, Early Period. — Before speaking of the 16th century it were well to look elsewhere in Europe, and especially at the Netherlands, from whence had come the invention in oil-painting, which so completely revolutionized technical methods. This discovery was made by the brothers Hubert and Jan Van Eyck of Bruges about the commencement of the 15th century, and carried to Italy by Antonello da Messina (1445-93). The greatest follower of this school was Hans Memling (1450–99), a comparison of whose works with those of his Italian contemporaries shows an excellence of technic and a power of expression not always in favour of the southern artists. Quentin Matsys of Antwerp (1460–1529) should also be mentioned as belonging to this school, a school which further exercised an influence upon that of Germany, with a result apparent in the next century, and was also the means of founding a school in Holland.

Italy, Germany, 16th Century. — The work of the 16th century is centred as much upon particular men as upon schools. Though many of the painters hereafter named were born in the latter half of the 15th century, their work separates itself so distinctly from that of their predecessors that it is the custom to consider it as belonging to the latter period. The four great schools were at Florence, Rome, Parma, and Venice, and each furnished from its scholars a painter who was in himself the particular glory of his school. Heading the Florentine comes Leonardo da Vinci (1452-1519), who established himself at Milan, and was celebrated as a painter, sculptor, architect, and engineer, his chief pupil being Bernardino Luini (1470–1530). Then following no man's style, but coming as a creator, we have Michel Angelo (1475–1564), combining in himself the highest powers in architecture, sculpture, and painting. He was followed in Florence by Fra Bartolommeo (1475–1517) and Andrea del Sarto (1488-1531). The Roman school, not indigenous but a continuation of the Umbrian school before mentioned, centres itself round the third great name, that of Raphael Sanzio (1483–1520), aptly called the prince of painters, who with his pupils and assistants, the chief among them being Giulio Romano, constitute the Roman school. Parma contains the work of Correggio (1494–1534), generally known as the head of the Lombard school, an artist unrivalled for grace, and harmony of chiaroscuro. Lastly, Venice produced a school supreme in respect of colour, and owing such power as it possesses entirely to the influence of the

Bellini. The first name in this period is Giorgione (1476–1511); then comes Titian (1477–1576), who takes rank with the great masters of the Florentine and Roman schools; followed by Tintoretto (1512–94) and Paolo Veronese (1532–88), who with Titian stand for all that is greatest in this school. However, it further produced Jacopo Bassano (1510–92), noted as the first to introduce pure landscape into his backgrounds; and Paris Bordone (1500–71), noted for his power in colouring and brilliancy of effect. In the north the Flemish school had become rapidly Italianized, with a result best seen in the following century. In Germany the influence of the Flemish school had made itself felt, and had produced in Albert Dürer of Nuremberg (1471–1528) the most celebrated master of his time north of the Alps. With him are associated Lucas Cranach (1472–1553), Burgkmair (1474–1559), and Albrecht Altdorfer (1486–1538).

Italy, Germany, &c., 17th Century.—The 16th century consummates the great age of modern art, an age that might justly be said to equal any period of Greek art. With the 17th century came the decline, brought about chiefly by the slavish imitation of the great painters of the preceding period, and art was only saved from extinction by a reaction headed by the Caracci. Their school, known as the Eclectic, was founded at Bologna by Ludovico (1555–1619), Agostino (1557–1607), and Annibale (1560–1609). Their principle was to unite a direct study of nature with a study of the excellencies of the great masters. To a certain extent the object was attained, and Guido Reni (1574–1642), Albani (1578–1660), and Domenichino (1581–1641) best illustrate in their works the results arrived at. Side by side with this school grew up that of the Naturalists at Naples, founded by Caravaggio (1569–1609), and having as his pupil Spagnoletto (1588–1656), who in turn taught Salvator Rosa (1615–73). Pietro da Cortona (1596–1669), the last of the Roman school, was the opponent of the Eclectic style. With the later Venetian school, which count Canaletto (1697–1768) and Tiepolo (1693–1770) among its disciples, the art of Italy may be said to have ended. Its seed spread itself and took root in France, and especially in Flanders, where Rubens (1577–1640) had become its greatest exponent, and whose pupils Jordaens (1594–1678) and **Vandyke** (1599–1641) were the most noteworthy artists of this school. In Holland, however, art had acquired a distinct individuality, first in Franz Hals (1584–1642) and above all in its typical painter Rembrandt (1607–69), both portrait-painters distinguished for their portrait groups; also by its landscape and *genre* painters, of which two classes of subjects this school is the great exponent. Among its landscape-painters are Van de Velde, Ruysdael, Hobbema, and Cuyp; and among its *genre* painters are Gerard Dow, Breughel, Teniers, and Van Ostade. The Spanish school, which stands alone in the prevailing religious ascetic character of its productions, and which in the preceding centuries had been influenced by Flemish and Italian painters, reached its greatest epoch in this century with Velasquez (1599–1660), one of the greatest of portrait-painters, Murillo (1613–80); and with these may be mentioned Zurbaran (1598–1662), and Cano (1601–67).

France, 16th–19th Century.—The effect of Italian art in France remains to be noted. The school of France, influenced at first both by Flemish and by Italian art, finally inclined to the latter, and in the reign of Francis I. (1515–47) a school was established at Fontainebleau and called by that name. Leonardo da Vinci worked in France, and Primaticcio carried on the unfinished work of Rosso (died 1541). Jean Cousin (1501–89) may be called the founder of the French school as opposed to the Italianized version which began with Simon Vouet (1590–1649). The native school was, however, finally overcome by the Italian method. Nicholas Poussin (1594–1665), figure and landscape painter, one of the greatest painters France can claim; Claude Lorraine (1600–82) and Gasper Dughet or Poussin (1613–75), landscapists, are painters who, though born in France, yet worked in Italy, and stand apart from the followers of the then national style; as does also Eustache Lesueur (1617–55), sometimes called the French Raphael. This national style was coeval with the court of Louis XIV. and representative of it, the chief exponents being Le Brun (1619–90), Mignard (1610–96), Du Fresnoy (1611–65), and Jouvenet (1644–1711). To continue the history into the 18th century, with France we find a steady deterioration both in technic and morality; the latter phase commenced by Watteau and Lancret, two painters truly French, and consummated by Boucher (1704–70). Greuze (1725–1805)

and Vien (1716–1809) were the first to protest against the corrupt influence of Boucher, and were the precursors of the reform, of which David (1748–1825) was the great instigator, a man whose influence made itself felt throughout Europe. He insisted upon a return to the study of the antique, and his followers number a few distinguished men, notably Gros and Guerin. Géricault (1774–1829), a pupil of Guerin, was the first to break with the extreme classicism of the school of David, and Ingres (1780–1867), Delacroix (1798–1863), Scheffer (1795–1858), and Delaroche, noted for the reality of his historical subjects and the tenderness and pathos of his sacred pictures (1797–1856) are the most distinguished names of the more direct and romantic style initiated by him. Modern French landscape art, founded upon an impulse received from England, has had Decamps (1803–66), Rousseau (1812–67), Corot (1796–1875), and Millet (1815–75) as its chief exponents. The work of Regnault (1843–71) remarkably illustrates the tendencies of modern French painting. Bastien Lepage (1848–84), with his literal renderings of nature, strongly influences the younger British school; and Meissonier, Gerome, Bougereau, Constans, and Cabanel, and Puvis de Chavannes as a decorative artist, are some of the chief members of a school which is at the present time influencing the art of the world.

Germany, Holland, &c., 19th Century.—Germany during the 18th century remained stationary in matters of art, but with the revival in France came a similar but slightly later movement in Germany, the precursors of which were Holzer (1709–40), a Tyrolese fresco painter, and Carstens (1754–98). The chief of the revivalists, however, was Overbeck (1789–1869), who, with a band of followers, founded a school at Rome in 1810, the principle animating whose work was that modern artists should only study the painters of the time preceding Raphael. Overbeck painted religious subjects, and worked both in fresco and oil. His works while possessing fine feeling are poor in colour and weak in chiaroscuro. Chief among his pupils is Cornelius (1783–1867), one of the greatest of modern German painters, and whose work is best seen in Munich. Schadow (1789–1862) was a pupil of Cornelius. Schnorr von Carolsfeld (1794–1872) chose for his subjects the mediæval history and myths of Germany, and also produced an extensive series of illustrations of the Bible of great merit. Kaulbach (1805–1874), a great historical painter and pupil of Cornelius, shows in his work some of the worst faults of the modern German school. Lessing (1808–1880) is famous both for his historic and landscape pictures, and among living painters worthy of note are Gabriel Max, and Menzel in historic, Knaus Vautier, Metzler, and Bochmann, in genre, and Achenbach in landscape. In Dutch art of the present day the same taste but not the same power of execution prevails as in earlier times. Seapieces, landscapes, scenes of common life are still the chief subjects selected. Schotel and Scholfhart have distinguished themselves as landscape-painters, Van Os, Van Stry, and Ommeganck as cattle and figure painters, whilst Josef Israels a painter of domestic scenes, with M. Maris and Mesdag are living artists. The influence of the French school is at present paramount in Belgium, as was the classicism introduced by David up to 1830. At that time a reaction was begun by Leys (1815–69), and followed up by Wappers (1803–74), painters who selected historical subjects of national interest. The work of reformation continued to be carried on notably by Gallait and De Keyser; whilst the strong current of the present French influence may be seen in the works of the living artists Alfred Stevens and Verlat. In Italy after a long period of artificialness and mediocrity there are signs of revival in painting. Pio Joris and Cammarano have gained distinction as painters of history, and Alberto dall' Oro and Pallizzi as painters of landscape. Morbelli and Segantini show in their works some signs of a return to nature. Spain, too, with the exception of the works of Fortuny, remains unindividualistic; but a strong influence is now being exercised upon her by French art. Russian art, which had remained at a stand-still since the Byzantine time, has since 1850 made great advances. It has produced Swedomsky, historical painter, Verestchagin, a traveller artist, and Kramskoë, a religious painter. Scandinavian art inclined for some time to the two schools of Düsseldorf and Paris, but has finally elected to follow the latter, several of her younger artists residing permanently there. Their choice is usually landscape, and among the chief names may be mentioned Normann Uhde and Edelfeldt. For painting in England see the article *England*.

In the U. States painting had but slow

development until a comparatively recent date. The troublous times of colonial settlement and the revolution were not conducive to art culture, although even then America had produced artists of merit—Benjamin West (1738–1820), who was made president of the Royal Academy of England; Copley (1737–1815), of high rank as portrait painter; Leslie (1794–1859), *genre* painter; and Allston (1779–1843), the first really distinctive American artist. Thomas Cole (1801–1848) originated the American school of landscape painting; his pictures are lovely and loving reproductions of nature; his worthy follower was Thomas Doughty. In the fields of history and *genre* may be found Rothermel, Page, Eastman, Johnson, Homer, Leutze, Weir, May, Powell, Darley, Lambdin, Hennessey, Freeman, La Farge, Elihu Vedder; in marine subjects, Bradford, Dana, De Haas, Dix, Haseltine, Moran; landscape has Church, Bierstadt, Kensett, Inness, Hart, Cropsey, Casilear, Gignoux, Wyant, the Giffords, Cranch, Griswold, Bristol, Brown, Fitch, &c. The superior art-illustrations in American publications depict matter purely American in conception and motive.

Paisiello (pa-i-si-el'lō), GIOVANNI, Italian singer and musician, born in 1741. In 1763 his first opera (La Pupilla) was performed with great applause at Bologna. By the year 1776 he had composed nearly fifty operas. In Russia he composed his best productions, La Serva Padrona and Il Barbiere di Seviglia, and in Vienna Il Rè Teodoro, and twelve symphonies for the Emperor Joseph II. He died in 1816.

Paisley, a municipal and parliamentary burgh of Scotland, in the county of Renfrew, on the White Cart, about 3 miles above the confluence of the united White and Black Cart with the Clyde, and 7 miles W.S.W. of Glasgow. It consists of an old town on the west or left, and a new town on the east or right bank of the river, communicating by three handsome bridges. The most noteworthy building is the Abbey Church, now a parish church, belonging to a monastery (of which little else now remains) founded in 1163 by Walter, son of Alan, the first of the house of the Stewarts, and at one time a very opulent foundation. Since 1860 the main body of the church, consisting of a nave and two aisles, the latter separated from the nave by five massive clustered columns on each side, has been restored. In 1889 a monument was erected by Queen Victoria in memory of her ancestors buried here. In St. Mirren's Chapel or the Sounding Aisle, on the south side, stands a tomb supposed to have been built in honour of Bruce's daughter Marjory. The only other noteworthy edifices are the new county buildings, the old county buildings and prison, a quadrangular pile in the castellated style; the town-hall, an imposing building in the classical style, erected by the munificence of the brothers Clark: the Neilson educational institution; the buildings containing the free library and museum; the Coats Observatory, the gift of Sir Peter and Mr. Thomas Coats; and the Coats Memorial Church (Baptist). Paisley has been long noted for its manufactures, especially of textile goods. The shawl manufacture, introduced about the beginning of the present century, and long a flourishing industry, is not now a staple, but the textile manufacture is still large, and to it has been added that of sewing cotton, for which Paisley is celebrated all over the world. Among the other manufactures are tapestry, embroidery, tartans, and carpets. There are also dye and print works, engineering works, soap-works, manufactories of starch, corn-flour, mustard, and chemicals; distilleries, breweries, and ship-building yards, chiefly for river steamers and dredgers. The river Cart has now been widened and deepened and commodious harbours constructed. Wilson the ornithologist, the poet Tannahill, and Prof. Wilson (Christopher North) were natives of Paisley, which possesses a bronze statue of the ornithologist and of the poet. Paisley is a town of ancient origin, having been at one time a Roman station under the name of *Vanduara*. It returns one member to parliament. Pop. in 1881, 55,627; in 1891, 66,427.

Palace Court, the court of the sovereign's palace at Westminster, which had jurisdiction of personal actions arising within the limits of 12 miles round the palace, excepting the city of London; instituted 1664, abolished 1849.

Pal'adin, a term originally applied to the *Comes palatii*, Count of the Palace, or Count Palatine, the official who superintended the household of the Carlovingian sovereigns, and then to the companions in arms of Charlemagne, who belonged to his court. Latterly it was used in a more general sense.

Palæarctic Region, in zoology, one of six divisions of the world based upon their characteristic fauna. It embraces Europe,

Northern Asia, and Africa north of the Atlas range.

Palæichthyes (pa-lē-ik'thi-ēz), a division of fishes comprising the Ganoidei and the Elasmobranchii.

Palæog'raphy (Gr. *palaios*, ancient, and *graphē*, writing) is the science by means of which ancient inscriptions, and the writings and figures on ancient monuments, are deciphered and explained; as distinguished from *diplomatics*, which deals with written documents.

Palæol'ogi, the name of the sovereigns of the last dynasty of the Byzantine Empire. The founder of the dynasty was Michael Palæologus, who in 1260 became Emperor of Nicæa, and in 1261 Emperor of Byzantium. See *Byzantine Empire*.

Palæontol'ogy (Greek, *palaios*, ancient, *onta*, beings) is the science which treats of the living beings, whether animal or vegetable, that have inhabited the globe in the successive periods of its past history. The comparison of the fossil remains of plants and animals, belonging for the most part to extinct species, has given a powerful impulse to the science of comparative anatomy, and through it a truer insight has been obtained into the natural arrangement and subdivision of the classes of animals. But the science which has profited in the highest degree from palæontology is geology. Palæontology, apart from its importance as treating of the past life-history of the earth, assists the geologist in his determination of the chronological succession of the materials composing the earth's crust. As a general result of united geological and palæontological researches, it has been found possible to divide the entire series of stratified deposits into a number of rock-systems or formations, each of which is defined by possessing an assemblage of organic remains which are not associated in any other formation. These systems as a whole are divided into three great divisions, based on the characters of their organic remains, and thus representing three successive life-periods, as follows:—*Palæozoic*, or ancient life epoch, which includes the Laurentian, Cambrian, Silurian, Devonian, Old Red Sandstone, Carboniferous, and Permian rock systems. *Mesozoic*, or middle life epoch, including the Triassic, Jurassic or Oolitic, and Cretaceous rock systems. *Cainozoic*, or recent life epoch, which comprises the Eocene, Miocene, Pliocene, and Post-tertiary rock systems. The fossil remains of the first two divisions mostly belong to extinct species. The Cainozoic fossils belong mostly to living species or species only recently extinct. See *Geology*.

Palæothe'rium, an extinct genus of Ungulate or Hoofed Quadrupeds with three toes. These animals resembled tapirs, and varied in size from a sheep to a horse. They

Palæotherium restored.

had twenty-two teeth in each jaw, and, in all probability, a short mobile snout or proboscis. This genus forms the type of the family Palæotheridæ, which occur as fossils in Eocene and Miocene strata. *P. magnum* is a familiar species.

Palæozoic. See *Palæontology*.

Palæ'stra, originally in Greece a place for wrestling, afterwards a place for training the athletes who contended in the public games.

Palais-Royal (pà-lā-rwà-àl), a popular resort of the Parisians, originally a royal palace as the name implies. The original palace was built (1629-36) by Richelieu, and by him presented to Louis XIII. It was confiscated by the Republicans in 1793, and the Tribunal sat in the palace during the Reign of Terror. At the Restoration it was repurchased by the Duke of Orleans, but in the revolution of 1848 it was again appropriated to the state. In 1871 it was set on fire by the Communists, but has since been restored. The Théâtre Français and several shops now form parts of the buildings of the Palais-Royal.

Palame'dea, a genus of S. American birds. *P. cornūta*, the horned-screamer (which see), is the typical species.

Palamkotta, town of India in Tinnevelli district, Madras Presidency, 2½ miles E. of Tinnevelli and 1 mile from the Tambraparni river. Pop. 17,964, about 2000 being Christians.

Palanpur. See *Pahlanpur*.

Palanquin, PALANKEEN (pal-an-kēn'), a covered conveyance used in India, China, &c., borne by poles on the shoulders of men, and in which a single person is carried from place to place. The palanquin proper is a sort of box about 8 feet long, 4 feet wide,

and as much in height, with wooden shutters on the venetian-blind principle. It used to be a very common conveyance in India,

Palanquin.

especially among the Europeans, but the introduction of railways and the improvement of the roads have almost caused its discontinuance.

Palatals, sounds which derive their character from the conjunction of the tongue and hard palate, as *ch* in *church*.

Pal'ate, the name applied to the roof of the mouth. It consists of two portions, the *hard* palate in front, the *soft* palate behind. The former is bounded above by the palatal bones, in front and at the sides by the alveolar arches and gums, being lined by mucous membrane; behind it is continuous with the soft palate. It supports the tongue in eating, speaking, and swallowing. The *soft palate* is a movable fold suspended from the posterior border of the hard palate. It consists of mucous membranes, nerves, and muscles, and forms a sort of partition between the mouth and the hinder nostrils. Its upper border is attached to the posterior margin of the hard palate; its lower border is free. The *uvula* hangs from the middle of its lower border, and on each side are two curved folds of mucous membrane called the *arches* or *pillars* of the *soft* palate. Between these on either side of the pharynx are the two glandular bodies known as *tonsils*. The upper surface of the soft palate is convex, the lower surface is concave with a median ridge, the latter pointing to the early or embryo stage of its formation, when it consists of two distinct parts. Non-union of these halves and of those of the hard palate constitutes the deformity known as *cleft palate*, often associated with hare-lip. Glands are abundant in the soft palate, secreting the mucus which serves to lubricate the throat during the passage of food. The soft palate comes into action in swallowing, and also in speaking, being of great importance in the utterance of certain sounds. The special use of the uvula is not well known. It is often relaxed or enlarged, causing a troublesome cough.

Palat'inate (German PFALZ), a division of the old German Empire, under the rule of counts-palatine (Pfalzgrafen), consisting of two separate portions distinguished as the Upper and Lower Palatinate. The Upper or Bavarian Palatinate was bounded mainly by Bohemia and Bavaria, and its capital was Amberg. The Lower or Rhenish Palatinate lay on both sides of the Rhine, surrounded by Baden, Alsace, Lorraine, &c., its chief towns being Heidelberg and Mannheim. The counts-palatine were in possession of the Palatinate and the districts belonging to it as early as the 11th century, and were long among the most powerful princes of the German Empire. At the Peace of Westphalia (1648) the Lower Palatinate was separated from the Upper, Bavaria getting the latter, while the former now became a separate electorate of the empire, and was henceforth generally known as *the* Palatinate. By the treaties of Paris (1814–15) the Palatinate was split up; Bavaria received the largest part, and the remainder was divided between Hesse-Darmstadt and Prussia. The name Palatinate now belongs to the detached portion of Bavaria on the west of the Rhine, while the Upper Palatinate forms another portion of the monarchy. See *Bavaria*.

Palatine. See *Palatinate* and *Count Palatine*.

Palatine Hill. See *Rome*.

Palat'ka, a port and city of Florida, on the western bank of the St. John's River, 50 miles from the sea. It is frequented by deep-sea as well as by river steamers, and has a trade in oranges, sugar, and cotton. Pop. 3000.

Palawan', an island on the north-east of Borneo, belonging to the Philippines; area, 4576 square miles. It is mountainous, well wooded and watered, and very fertile, but unhealthy. Pop. (chiefly Malays), 28,000.

Palay', an Indian climbing plant (*Cryptostegia grandiflora*) of the nat. order Asclepiadaceæ. Its stalk-fibres, which are strong and white, are spun into a very fine yarn; and its milky juice forms a kind of caoutchouc.

Palazzo'lo, a city of Sicily, 28 miles west of Syracuse. Here are the remains of the ancient city of Acrae, founded by Syracuse 663 B.C. Pop. 11,069.

Pale, in heraldry, the first and simplest kind of ordinary. It is bounded by two vertical lines at equal distances from the sides of the escutcheon, of which it incloses one-third. See *Heraldry*.

A pale azure.

Pale, THE, or the ENGLISH PALE, a name formerly given to that part of Ireland which was completely under English rule, in distinction from the parts where the old Irish laws and customs prevailed.

Paleæ (pā'lē-ē), in botany, the bracts that are stationed upon the receptacle of Compositæ between the florets; also interior bracts of the flowers of grasses.

Palembang', a town of Sumatra, capital of the province of same name, on the Moosi, here called the Palembang. There are 25,000 inhabitants, partly inhabiting houses raised on posts, and partly living on rafts moored in the river. Its port is one of the best in the Malay Archipelago.

Palen'cia, a town of Spain in Leon, capital of a province of same name, situated on the Carrion, an affluent of the Pisuerga. It is a bishop's see, and has a fine Gothic cathedral. Pop. 13,126.—The province of Palencia is fertile and watered by the Carrion and Pisuerga. Area, 3128 square miles; pop. 184,668.

Palenque (pä-len'kā), a village of Mexico, state of Chiapas, 60 miles N.E. of Ciudad Real. About 7 miles S.W. of it are some of the most extensive and magnificent ruins in America, belonging to the period anterior to the Spanish conquest. The principal of these, called the 'palace,' is 220 feet long by 180 feet wide, with numerous sculptures and hieroglyphics.

Paler'mo (ancient *Panormus*), a seaport town, the capital of Sicily, beautifully situated on the north side of the island. It is built in the form of an amphitheatre facing the sea, and is surrounded by walls. The city is ornamented by numerous fountains, and has many public edifices, including a cathedral of the 10th century which contains monuments in porphyry of the Emperor Frederick II. and King Roger the Norman. Other notable buildings are the churches of St. Peter and St. Dominic; a royal palace of Saracenic origin, containing the chapel of King Roger; the Cappella Palatina (Palatine Chapel), built in a mixed Saracenic and Norman style, and dating prior to 1132, having the walls entirely covered with rich Byzantine mosaics on a golden ground; the picture-gallery and the armoury; the National Museum, containing some of the oldest monuments of Greek plastic art to which a definite date can be assigned (6th century B.C.); the archiepiscopal palace, the custom-house, the university, three theatres, and numerous other structures of architectural interest. The port is inclosed by a mole 1300 feet in length. Palermo is the residence of the military commandant of the island, and has an arsenal and ship-building yards. The manufactures consist chiefly of silks, cottons, oil-cloth, leather, glass, and gloves. The principal exports are sumach, wine and spirits, fruits, sulphur, skins, oil, essences, cream of tartar, liquorice, and manna; imports, colonial produce, woollen, cotton and silk tissues, hardware, earthenware, &c. The fisheries are very productive, and give employment to nearly 40,000 hands. Palermo was probably founded by the Phœnicians; it afterwards became the capital of the Carthaginian possessions in Sicily. It was taken by the Romans 254 B.C. The Saracens held it for a time, and in 1072 it fell to the Normans. The German emperors and the French subsequently held it, and since the Sicilian Vespers (1282) it has shared the fortunes of the Sicilian kingdom. The court of Naples resided here from 1806 to 1815. Garibaldi captured the town in 1860. Pop. 205,712.—The province of Palermo contains an area of 1963 square miles. Pop. 1891, 791,928.

Pa'les, the goddess (sometimes regarded as a god) of sheepfolds and pastures among the Romans. Her festivals, called *Palilia*, were celebrated on the same day as the anniversary of the founding of Rome.

Pal'estine, CANAAN, or the HOLY LAND, a maritime country of Asiatic Turkey, in the south-west of Syria, having on the north the mountains of Lebanon and Anti-Lebanon, east the Arabian Desert, south Arabia, and west the Mediterranean; length, north to south, about 140 miles; breadth, about 80 miles; area, nearly 10,000 square miles (or one-third the size of Scotland). The coast has no indentations except the Bay of Acre in the north. The chief feature of the interior, besides its generally irregular character, is the deep valley of the Jordan, a river

which intersects the country from north to south, and connects three lakes, the Dead Sea, Lake of Gennesaret, and Lake Merom. The surface is generally mountainous, or consists of a series of plateaux both on the west and the east of the valley of the Jordan. With the exception of Mount Hermon in the north (9050 feet) few of the heights exceed 3000 feet. The most remarkable are Carmel, on the south-west side of the Bay of Acre; Jebel Tur (Tabor), farther inland; Ebal and Gerizim, about the middle of the country; Zion, Moriah, and the Mount of Olives, in and near Jerusalem. Palestine has comparatively few plains, though in few countries is there such endless variety of valley as to size, shape, colour, and fertility. The maritime or coast plains of Sharon and Philistia, the river plain of Jordan, and the plain of Esdraelon in the north, are all that are worthy of mention. The maritime plains are well peopled and cultivated. The Jordan plain is nearly a waste of sand. The plain of Esdraelon or valley of Jezreel is of great fertility. The principal river is the Jordan (which see). This river has a length of 200 miles, including windings, but its direct course is only about 70. Its course from Merom to the Dead Sea is mostly below the sea-level. Most of the so-called rivers of Palestine are merely winter torrents which run dry in summer. Of the few permanent rivers emptying into the Mediterranean, the most important are the Kishon, which drains the plain of Esdraelon; and the Aujeh farther south. The chief tributary of the Jordan is the Zerka or Jabbok. The most remarkable lake is the Dead Sea (which see), 46 miles long, 9 or 10 broad, and fully 1300 feet below the Mediterranean. The other lakes are Bahr-el-Huleh (Merom), 5 miles long and 4 miles broad, about 6 feet above the Mediterranean; and Lake Gennesaret or the Sea of Galilee, 682 feet below it, 12½ miles long, 7½ broad. In Palestine the wells and springs are numerous, and are all counted worthy of note. Among the most interesting are the springs of hot water which issue forth on both sides of the Jordan valley. Of these there are five or six with a temperature varying from 109° to 144° F. As regards geology the chief rock formation of the country on both sides of the Jordan is limestone, full of caves. Sandstone also occurs, with basalt and other volcanic rocks, the latter being especially common on the east side of Jordan. Signs of volcanic action are abundant, and earthquakes are still common. The year may be divided into two seasons, summer and winter. During the former, which lasts from April to November, little or no rain falls; during the latter there is a considerable fall of rain, the annual average at Jerusalem being about 60 inches. In the Jordan valley and along the Mediterranean lowlands the summer heat is apt to be oppressive. During the winter the ground is seldom, if ever, frozen except on the higher elevations. Palestine was once very fertile, and were the same attention paid, as formerly, to artificial irrigation, and the construction of reservoirs and water-courses, it might be so again. Among the products, besides the usual cereals, are grapes, figs, olives, oranges, and apricots. The flora of Palestine is rich in flowering plants, including the scarlet anemone, ranunculus, narcissus, crocus, pheasant's-eye, &c. The country was once well timbered, but it is now, as a whole, bare and desolate, though forests of pine and oak exist on the east of the Jordan. On the west side of the river, however, there are few trees. The most common tree is the oak, including the prickly evergreen oak and two deciduous species. Other trees are the olive, palm, oleander, sycamore, walnut, ash, cedar. The wild animals include the leopard, hyæna, bear, wolf, jackal, boar, antelope, gazelle, porcupine, coney, jerboa, &c. The domestic animals of burden are the ass, mule, and camel, the horse being little used. The cattle are not generally very numerous. Sheep and goats are abundant. Among the birds are eagles, vultures, hawks—birds of prey being very numerous—ravens, bee-eaters, hoopoes, storks, and nightingales. Fish abound in the Sea of Galilee and the Jordan. There are many species of reptiles, among them being the chamæleon, land and water tortoise, lizards, and serpents, and even the crocodile.

The name Palestine, from the Hebrew *Pelescheth*, means the land of the Philistines. It is properly only applicable to the south-west part of the country. The ancient name of the country was Canaan, and when thus named, in the time of the patriarchs, it was parcelled out among a number of independent tribes, all probably Semitic. In the time of Moses the district east of the Jordan was taken and divided among the tribes of Reuben and Gad, and the half-tribe of Manasseh; and latterly the whole territory was apportioned among the twelve Jewish tribes. For the subsequent his-

tory see the article *Jews*. In the time of our Saviour Palestine was held by the Romans, and divided into the four provinces of Galilee, Samaria, Judea, and Perea. In 606 Palestine was taken by the Saracens under Omar. The severities exercised towards Christians gave rise to the Crusades, but Mohammedanism prevailed, and the country sank into a degraded state. The sultan of Egypt ruled it till 1517, when it was incorporated with the Turkish Empire.

It is only within a comparatively recent period that the exploration of Palestine has been carried out systematically and with some attempt at thoroughness, though much yet remains to be done. The most valuable results have been those achieved under the direction of the 'Palestine Exploration Fund,' a society organized in 1865 for the purpose of making an exhaustive exploration and an exact survey of the Holy Land. In 1870 the American Palestine Exploration Society was organized, and it was agreed that the English society should confine itself to the western side of the Jordan, and the American society to the eastern. The triangulation of Western Palestine was begun in 1871 and finished in 1877. A large and detailed map of the country has been published and an immense mass of valuable information regarding topography, natural history, &c., accumulated. The present population of the country is estimated at 650,000, the Arab element being probably the prevailing one, and the Arabic language generally in use. The people consist partly of the fellahin or settled cultivators, artisans, &c.; partly of the nomad Bedouin, who live by rearing cattle or by less reputable means. The country exports some grain, olive-oil, oranges, &c.

Palestine, Anderson co., Texas, 81 miles S. W. of Longview, has manufactories of cottons, hides, lumber, &c. Pop. 1890, 5838.

Palestri'na (ancient *Prænestc*), a town of Central Italy, province of Rome, 23 miles E.S.E. of Rome. It is of Greek origin, and has numerous ancient remains, and the Barberini Palace, now deserted. Pop. 5855.

Palestri'na, GIOVANNI PIERLUIGI (or PIETRO ALOISIO) DA, Italian musical composer, born at Palestrina in 1524, died in 1594. In 1551 he was appointed by Pope Julius III. master of a choir of boys in the Julian Chapel, and was the first to receive the title of chapel-master. In 1554 he published a first collection of masses, and Julius admitted him into the college of choristers of the pope's chapel. He was dismissed by Pope Paul IV. in 1555, but in the same year he was appointed chapel-master of San Giovanni in Laterano. He held this post for six years, when he exchanged it for a similar appointment in the church Santa Maria Maggiore, in which he continued till 1571. In the meantime the Council of Trent, on reassembling in 1562, pointed out the necessity of a reform in church music, which had become vulgar and profane. A commission was appointed, and Palestrina composed three beautiful masses which created quite a revolution in sacred composition. One of them, the Missa Papæ Marcelli, is still celebrated. In 1571 Palestrina was appointed chapel-master of the Basilica San Pietro in Rome. He left an extraordinary number of musical compositions.

Palette, PAINTER'S, an oval tablet of wood, or other material, very thin and smooth, on which painters lay the various colours they intend to use, so as to have them ready for the pencil. In connection with the palette painters use a palette-knife, a thin round-pointed knife for mixing up colours. The palette is held by a hole at one end in which the thumb is inserted.

Paley, FREDERICK APTHORP, grandson of the following, was born in 1816. Educated at Shrewsbury, he went afterwards to St. John's College, Cambridge, and took his degree in 1838. In 1846 he became a Roman Catholic, and in 1874 accepted the post of Professor of Classical Literature in the Catholic College at Kensington. He died in 1888. His best title to fame rests on the valuable work he did as editor and annotator of classical texts, especially Æschylus and Euripides.

Paley, WILLIAM, English theological and philosophical writer, was born at Peterborough in 1743, died 1805. In 1758 he became a sizar of Christ's College, Cambridge, where he graduated B.A. as first wrangler in 1763. In 1766 he took his degree of M.A., and became a fellow and tutor of his college. In the following year he was ordained. In 1776 he married and gave up his fellowship. In 1780 he became prebendary of Carlisle, and in 1785 chancellor of the diocese. In 1794 he was made prebendary of St. Paul's and sub-dean of Lincoln; and in 1795 he received the rectory of Bishop-Wearmouth. He also received in this year the degree of D.D. from Cambridge University. His chief works are:

The Principles of Moral and Political Philosophy (1785); Horæ Paulinæ (1790); A View of the Evidences of Christianity (1794); Natural Theology, or Evidences of the Existence and Attributes of the Deity collected from the Appearance of Nature (1802), founded on a work by Nieuwentyt, a Dutch philosopher. As a writer he had little claim to originality, but was distinguished by clearness and cogency of reasoning, lucidity of arrangement, and force of illustration. His system of moral philosophy is founded purely on utilitarianism.

Palghat (päl-ghät'), a town in Malabar, Madras, India. It is a busy entrepôt for the exchange of produce between Malabar and the upland country. Pop. 36,339.

Palgrave, Sir Francis, was born in London in 1788. He was a Jew, and his original name was Cohen, which he changed to Palgrave on embracing Christianity in 1823. He was called to the bar in 1827, and made himself known by his edition of the Parliamentary Writs from 1273 to 1327 (1827–34), History of England (1831), Rise and Progress of the Commonwealth (1832). In 1832 he was knighted. He served on the Municipal Corporation Commission, 1833–35, and was appointed deputy-keeper of records in 1838. He died at Hampstead 6th July, 1861. His other works include Truths and Fictions of the Middle Ages (1844), Reports of the Deputy-keeper of the Public Records (1840–61), and the History of Normandy and England (1851–60).

Palgrave, Francis Turner, son of the above, was born in London in 1824, and educated at Charterhouse and Baliol College, Oxford. He became a fellow of Exeter College, and was for five years vice-principal of the Schoolmaster's Training College at Kneller Hall. He then acted as private secretary to Lord Granville, and has since held a post in the Education Department. In 1886 he was elected professor of poetry at Oxford. His literary works include Idylls and Songs (1854), Golden Treasury of the Best Songs and Lyrical Poems (1861), Sonnets and Songs of Shakspere (1865), Essays on Art (1866), and Selected Lyrical Poems of Herrick (1877).

Palgrave, William Gifford, brother of the foregoing, born in London 1826, died in 1888. He graduated at Oxford, and from 1847 to 1853 served in the Bombay Light Infantry. He then became a Roman Catholic, was ordained a priest, joined the Jesuits, and engaged in missionary labours in India and Syria. In 1862 he undertook for Napoleon III. a journey through Central and Eastern Arabia. He subsequently left the Jesuits, entered the diplomatic service, and married. He acted as British consul at various places until 1876. He was appointed consul-general in Bulgaria in 1878, in Siam in 1879, and in 1884 minister resident and consul-general in Uruguay, and his death took place at Monte Video. His literary works include Personal Narrative of a Year's Journey through Central and Eastern Arabia (1872); Hermann Agha, a story (1872); Alkamah's Cave (1875); and Dutch Guiana (1876).

Pâli, the sacred language of the Buddhists, as closely related to Sanskrit as Italian to Latin. It is the language in which the oldest religious, philosophical, and historical literature of Buddhism is written, and is especially the language of the sacred books of the Buddhists of Ceylon, Burmah, and Siam; but it is no longer spoken anywhere, though a corrupt form of it is to some extent used for literary purposes. The study of Pâli was introduced into Europe by Lassen and Burnouf.

Palicourea (pā-li-kö'rē-a), a genus of plants, nat. order Rubiaceæ, tropical American shrubs, with small or rather large flowers in compound thyrses or corymbs. *P. officinalis* is reported to be a powerful diuretic, and *P. tinctoria* forms a fine red dye, much valued in Peru. *P. densiflora* yields coto bark (which see).

Pal'impsest (from Greek *palin*, again, *psēstos*, rubbed), a manuscript prepared by erasure for being written on again, especially a parchment so prepared by washing or scraping. This custom was brought about by the costliness of writing materials, and was practised both by the Greeks and Romans, and in the monasteries, especially from the 7th to the 13th centuries. That which replaced the ancient manuscripts was nearly always some writing of an ecclesiastical character. The parchments which have been scraped are nearly indecipherable. Those which have been washed have often been revived by chemical processes. Fragments of the Iliad and extensive portions of many Greek and Roman writers have been recovered by these means.

Palinode, in a general sense, a poetical recantation or declaration contrary to a former one. In Scots law it is a solemn recantation demanded in addition to damages in actions on account of slander or defamation

raised in the commissary court, and even in the sheriff court.

Palisade, a fence or fortification consisting of a row of strong stakes or posts set firmly in the ground, either perpendicularly or obliquely, for the greater security of a position, and particularly for the closing up of some passage or the protection of any exposed point.

Palisander-wood, a name in France for rose-wood and some other woods.

Palissy, BERNARD, a French artist and philosopher, born about 1510. He was apprenticed in a glass-work at Agen, where he learned the art of painting on glass. Having completed his apprenticeship he set out on a tour of France and Germany (1528), maintaining himself by practising his craft of glass-painter and by land-surveying. During his travels he studied attentively all the books within his reach, and acquired an extensive knowledge of natural science. In 1505 he returned to France, married, and settled at Saintes. Shortly after his return his attention was attracted by a fine specimen of enamelled pottery, and he thereupon resolved to discover for himself the secret of the enamel. Being ignorant of the potter's art he had to grope his way, and laboured on year after year without success, almost starving, and reducing his family to the depths of poverty. At length, after sixteen years of unremunerated labour (1538–54), he obtained a pure white enamel, affording a perfect ground for the application of decorative art. He was now able to produce works in which he represented natural objects grouped and portrayed with consummate skill, and his enamelled pottery and sculptures in clay became recognized as works of art. In 1562 he went to establish himself at Paris, where he continued to work at his art, and also delivered scientific lectures, which were attended by the most distinguished men in Paris, and contained views far ahead of his time. He suffered persecution as a Huguenot, and was arrested in 1589 and thrown into the Bastille, where he is said to have died in 1590. He left several philosophical works. See next article.

Palissy-ware, a peculiar kind of French art pottery invented by Bernard Palissy. The surface is covered with a jasper-like white enamel, upon which animals, insects, and plants are represented in their natural forms and colours. Specimens of this ware are much valued and sought after by collectors.

Paliu'rus, a genus of deciduous shrubs, natives of the south of Europe and Asia Minor, and belonging to the nat. order Rhamnaceæ. See *Christ's-thorn.*

Palk Strait, a channel between the mainland of India and the north part of Ceylon, abounding in shoals, currents, sunken rocks, and sand-banks.

Pall, a covering of black velvet thrown over a coffin while being borne to burial, the ends of which in a walking procession are held by the friends of the deceased. In another sense the pall or *pallium* is an ecclesiastical vestment sent by the sovereign pontiff on their accession to patriarchs, primates, and metropolitans, and sometimes, as a mark of honour, to bishops. It is made of white lamb's wool, and consists of a narrow strip of cloth encircling the neck and shoulders, with two narrow pieces hanging down, all embroidered with crosses.

Palladian Architecture, a species of Italian architecture due to Palladio (see next article), founded upon the Roman antique as interpreted by the writings of Vitruvius, but rather upon the secular buildings of the Romans than upon their temples. It is consequently more applicable to palaces and civic buildings than to churches. A characteristic feature of the style is the use of engaged columns in façades, a single range of these often running through the two principal stories. It was introduced into England by Inigo Jones, a follower of the Venetian school of Palladio.

Palla'dio, ANDREA, one of the greatest classical architects of modern Italy, was born at Vicenza in 1518, died at Venice in 1580, where he was architect of the republic. He perfected his architectural acquirements at Rome, and on his return to Vicenza he established his fame by his designs for many noble buildings both there and in other parts of Italy. From 1560 he erected many buildings at Venice. (See preceding article.) He was the author of a Treatise on Architecture.

Palla'dium, a wooden image of Minerva (Pallas) which is said to have fallen from heaven, and to have been preserved in Troy. The Trojans believed that their city would be invincible so long as it contained the Palladium. The Romans pretended that it was brought to Italy by Æneas, and preserved in the temple of Vesta at Rome, but several Greek cities claimed to possess it.

Palla'dium, a metal discovered by Wollaston in 1803, and found in small quantity

associated with native gold and platinum. It presents a great general resemblance to platinum, but is harder, lighter, and more easily oxidized; symbol Pd, specific gravity about 11·5. It is useful on account of its hardness, lightness, and resistance to tarnish, in the construction of philosophical instruments.

Palla'dius, RUTILUS TANNIS ÆMELIANUS, a writer of the 4th century after Christ. He was the author of a poem on agriculture, De Re Rustica, in 14 books.

Pallah, a species of antelope (*Æpyceros melampus*) found in South Africa.

Pallan'za, a town of Italy beautifully situated on a promontory on the west side of Lago Maggiore. Pop. about 4200.

Pallas, of the minor planets revolving round the sun between Mars and Jupiter, that whose orbit is most inclined to the ecliptic. It was discovered in 1802 by Olbers at Bremen. It revolves round the sun in 4·61 years; diameter 172 miles.

Pallas, PETER SIMON, traveller and naturalist, born at Berlin in 1741, died there in 1811. Becoming distinguished as a naturalist he was sent by Catherine II. of Russia in charge of a scientific expedition to Asiatic Russia. The results of his observations were published in his Travels through Various Provinces of the Russian Empire (1771–76). His other chief works are Spicilegia Zoologica (1767–80), Flora Rossica (1784–85), Journey through Southern Russia (1799, Eng. trans. 1812).

Pallas Athēnē, the Greek goddess of wisdom, subsequently identified with the Roman Minerva. See *Athena.*

Pallavicino (-chē'nō), SFORZA, son of Marquis Alessandro Pallavicino, of Parma, was born at Rome in 1607, studied in the Roman College, and afterwards joined the Jesuits. He is famous as the historian of the Council of Trent, and stood high in the esteem of Pope Alexander VII., who made him a cardinal. He died in 1667.

Palliobranchiata, the name formerly applied to the class of Brachiopodous Mollusca from the belief that the pallium or mantle lining the shell formed the chief organ of respiration.

Palliser, SIR WILLIAM, born in Dublin 1830. After passing through the Staff College at Sandhurst he obtained a commission in the Rifle Brigade (1855). He was subsequently transferred to the Hussars, and retired from the army in 1871. He is the inventor of projectiles and guns which bear his name, and is the author of many improvements in fortifications, &c. He was knighted in 1873.

Pallium. See *Pall.*

Pall-mall, an ancient game, in which a round box-wood ball was with a mallet or club struck through a ring elevated upon a pole, standing at either end of an alley, the person who could do so with fewest blows, or with a number agreed on, being the winner. The game was formerly practised in St. James's Park, London, and gave its name to the street called Pall Mall.

Pall Mall Gazette, London evening newspaper, established in 1865. Its editors in succession have been Frederick Greenwood, John Morley, W. T. Stead, and E. J. Cook.

Palm, the tree. See *Palms.*

Palma, an episcopal city of Spain, capital of the Island of Majorca, 130 miles south of Barcelona. It is built in the form of an amphitheatre, and enjoys an extremely mild and salubrious climate. The principal public buildings are the cathedral, the exchange, the governor's palace, and the town-house. There are schools of medicine and surgery, normal and nautical schools, two public libraries, and a museum. Ship-building yards employ numerous hands. Palma is the port of the whole island, and has an important trade. Pop. 59,493.

Palma, JACOPO, Italian painter, called Palma Vecchio (the elder Palma), was born near Bergamo about 1480, and died in 1528. He is supposed to have been a pupil to Titian, and his later manner seems to have been modified by study of Giorgione. His work is less remarkable for draughtmanship than for the suffused golden brilliance of its colouring. His most notable pieces are six paintings in the church of S. Maria Formosa at Venice, and the Three Graces in the Dresden gallery.

Palma, LA, the most north-westerly of the Canary Islands; area, 224 square miles; capital, Santa Cruz de la Palma, the principal port. It consists for the most part of elevated mountains, and in the north the coast is high and precipitous. The climate is agreeable and healthy, and the soil fertile. Besides a small quantity of grain, La Palma produces wine, fruits, sugar, honey, wax, silk, &c. Pop. 38,822.

Palma Christi, a name frequently applied to the castor-oil plant.

Palma di Montechiaro (mon-tā-kyä'rō), a town of Sicily, in the province and 14 miles E.S.E. Girgenti. Pop. 11,702.

Palmas, CAPE, a headland of W. Africa, on the Guinea coast, lat. 4° 22′ 6″ N., lon. 7° 44′ 15″ W. There is a lighthouse with a fixed light, and the adjacent harbour, which is the only one between Sierra Leone and Benin, is spacious, secure, and protected by a reef from the swell of the ocean.

Palm-cat. See *Paradoxure.*

Palmel'leæ, PALMELLACEÆ, a nat. order of green-spored algæ, among the lowest of plants, including red snow (*Protococcus nivalis*), gory dew (*Palmella cruenta*), &c.

Palmer (pä'mėr), in mediæval times, was the name given properly to a pilgrim who had visited the Holy Land, from the circumstance that those who performed the pilgrimage to the sacred sepulchre generally carried on their return a palm branch as a memorial of their journey. The name was also given to other pilgrims.

Palmer, EDWARD HENRY, English Oriental scholar, born at Cambridge 1840; graduated at St. John's College in 1867. He was a member of the survey expedition to Sinai (1868–69) and to Moab (1869–70), and on his return became professor of Arabic at Cambridge (1871). In 1882 he was killed by the Arabs in the Sinaitic peninsula. Among his numerous works are a Persian-English Dictionary (1876).

Palmer, Hampden co., Mass., on the Chicopee R., has manuf. of carpets, carriages, castings, straw hats, &c. Pop. 1890, 6520.

Palmerston, the chief settlement in the Northern Territory of S. Australia, on Port Darwin, accessible to ocean-going steamers of the largest draught. Pop. 600.

Palmerston (pä'mėr-stun), HENRY JOHN TEMPLE, VISCOUNT, English statesman, was born in Westminster 1784, died 1865. He was educated at Harrow, Edinburgh University, and St. John's College, Cambridge. In 1802 he succeeded his father in the title (an Irish one). In 1807 he was returned as member for Newport, I. of Wight, and became junior lord of the admiralty in the Duke of Portland's administration. In 1809 he became secretary of war, and two years later he was elected member for Cambridge University. He was a supporter of Catholic emancipation, and retired from office in the Wellington ministry in 1828 with others of the Canning party. He had already made a reputation for his command of foreign policy, and in 1830 he was made foreign secretary in the Whig ministry of Earl Grey. From this time he continued to be a member and leader of the Liberal party. In 1831 he was returned for Bletchingley, and after the Reform Bill (1832) for South Hants. He retired from office in Dec. 1834, but in April 1835 he resumed his former appointment under Lord Melbourne. He continued in office as foreign secretary until 1841. It was

Viscount Palmerston.

during this period that he gained his great reputation for vigilance and energy in the conduct of foreign affairs. In 1845 he supported the repeal of the corn-laws, and in 1846 he was foreign secretary in the Russell ministry. Several causes of dissatisfaction, the chief being his recognition of Louis Napoleon without consulting his colleagues, led to Palmerston's resignation in Dec. 1851. In Feb. 1852, he became home secretary in the coalition ministry of Lord Aberdeen. On the resignation of this ministry he became prime minister, which position he held, with a brief interruption, for the remainder of his life. He was made D.C.L. of Oxford in 1862, and elected Lord-rector of Glasgow University in 1863.

Palmer Worm, the common name for all the hairy caterpillars, but particularly that of the tiger-moth (*Arctia caja*).

Palmet'to Palm, a common name of several palms, especially of the *Sabal Palmetto,* the cabbage-palm, which grows in the West Indies and in the southern states of North America. It attains the height of 40 or 50 feet, and is crowned with a tuft of large leaves. It produces useful timber, and the leaves are made into hats, mats, &c.

Palmip'edes. See *Natatores.*

Palmistry. See *Cheiromancy.*

Palmit'ic Acid, a fatty acid occurring in many fats, whether of the animal or vegetable kingdom, such as palm-oil, butter, tallow, lard, &c., and existing partly in a free state but generally in combination with glycerin (as a glyceride). It forms a solid, colourless, inodorous body, which melts at 62° C.

Palm-kale, a variety of the cabbage extensively cultivated in the Channel Islands. It grows to the height of 10 or 12 feet, and has much the aspect of a palm.

Palm-oil, a fatty substance obtained from several species of palms, but chiefly from the fruit of the oil-palm, or *Elæis guineensis*, a native of the west coast of Africa. This tree grows to the height of 30 feet, bears a tuft of large pinnate leaves, and has a thick stem covered with the stumps of the stalks of dead leaves. (See figure under *Palms*.) The fruits, which are borne in dense clusters, are about 1½ inch long by 1 inch in diameter, and the oil is obtained from their fleshy covering. In cold countries it acquires the consistence of butter, and is of an orange-yellow colour. It is employed in the manufacture of soap and candles, for lubricating machinery, wheels of railway-carriages, &c. By the natives of the Gold Coast this oil is used as butter; and when eaten fresh is a wholesome and delicate article of diet. It is called also *Palm-butter*.

Palms, the Palmaceæ, a nat. order of arborescent endogens, chiefly inhabiting the tropics, distinguished by their fleshy, colourless, six-parted flowers, inclosed within spathes; their minute embryo lying in the midst of albumen, and remote from the hilum; and their rigid, plaited or pinnated leaves, sometimes called fronds. The palms are among the most interesting plants in the vegetable kingdom, from their beauty, variety, and associations, as well as from their great value to mankind. While some, as *Kunthia montāna*, *Oreodoxa frigida*, have trunks as slender as the reed, or longer than the longest cable (*Calămus rudentum* being 500 feet), others, as *Jubœa spectabilis* and *Cocos butyracea*, have stems 3 and even 5 feet thick; while some are of low growth, as *Attalēa amygdalina*, others exhibit a stem towering from 160 to 190 feet high, as *Ceroxylon andicŏla* or wax-palm of South America. Also, while they generally have a cylindrical undivided stem, *Hyphœne thebaica* (the doum palm of Upper Egypt) and *Hyphœne coriacea* are remarkable for their repeatedly divided trunk. About 600 species are known, but it is probable that many are still undescribed. Wine, oil, wax, flour, sugar, sago, &c., are the produce of palms; to which may be added thread, utensils, weapons, and materials for building houses, boats, &c. There is scarcely a single species in which some useful property is not found. The cocoa-nut, the date, and others are valued for their fruit; the cabbage-palm, for its edible terminal buds: the fan-palm, and many more, are valued for their foliage, whose hardness and durability render it an excellent material for thatching; the sweet juice of the Palmyra and others, when fermented, yields wine; the centre of the sago-palm abounds in nutritive starch; the trunk of the wax-palm exudes a valuable wax; oil is expressed in abundance from the oil-palm; many of the species contain so hard a kind of fibrous matter that it is used instead of needles, or so tough that it is manufactured into cordage; and, finally, their trunks are in some cases valued for their strength, and used as timber, or for their elasticity or flexibility. There is only one European species, the *Chamærops humilis*. See *Chamærops;* also *Areca*, *Betel-nut*, *Cabbage-palm*, *Cocoa-nut*, *Coquilla-nut*, *Date*, *Doum Palm*, *Fan-palm*, *Palm-oil*, *Palmyra Palm*, &c.

Palm-oil Tree (*Elæis guineensis*).

Palm-sugar, a saccharine substance obtained from the juice of various palms.

Palm Sunday, the last Sunday before Easter, on which Christ's entry into Jerusalem, when palm branches were strewed before him, is celebrated. It is still celebrated with much solemnity by the R. Catholics, and branches are strewed in the churches.

Palm Wine or Toddy, a species of wine obtained by fermenting the juice of the flowers and stems of the cocoa-nut palm, the Palmyra-palm, the oil-palm, and other palms.

Palmy'ra (Hebrew, *Tadmor*, City of Palms), an ancient city of Syria, now in

ruins, situated in an oasis 140 miles E.N.E. of Damascus. It was founded or enlarged by Solomon in the 10th century B.C. It was an entrepôt for the trade between Damascus and the Mediterranean, and during the wars between the Romans and the Parthians it acquired great importance. It became the faithful ally of Rome, and during the reign of Gallienus (260–268) Odenathus, the ruler of Palmyra, established an independent Palmyrene kingdom. Odenathus was succeeded by his widow Zenobia, to whom Palmyra chiefly owes its fame, and who took the title of Queen of the East. She was besieged in Palmyra by Aurelian, and compelled to surrender. On his departure the inhabitants revolted, on which Aurelian returned and destroyed the city (A.D. 273). He permitted the inhabitants to rebuild it, but it never recovered its importance. In 1400 Tamerlane completely destroyed it. There are remains of ancient buildings, chiefly of the Corinthian order, with the exception of the Temple of the Sun, which is Ionic. See *Zenobia*.

Palmy'ra Palm (*Borassus flabelliformis*), the common Indian palm, a tree ranging

Palmyra Palm (*Borassus flabelliformis*).

from the north-eastern parts of Arabia through India to the Bay of Bengal. In India and other parts of Asia it forms the chief support of 6,000,000 or 7,000,000 of population. Its fruit is a valuable food, its timber is excellent, and it furnishes thatch, cordage, and material for hats, fans, umbrellas, &c. It produces sugar and arrack, and its leaves are used for writing-tablets. The young shoots are boiled and eaten, the seeds are edible, and the fruit yields a useful oil. A full-grown palmyra is from 60 to 70 feet high, and its leaves are very large. The name palmyra-wood is frequently given to other woods of a similar nature.

Palo'lo, a dorsibranchiate annelid (*P. viridis*) found in great abundance in the sea near the coral reefs in the South Sea Islands. They are taken in large numbers in nets by the islanders, who esteem them, when roasted, as a great delicacy.

Palos, a small town of Andalusia, in Spain, whence Columbus sailed for the discovery of the New World in 1492. Pop. 1200.

Palpi, jointed processes, supposed to be organs of touch, attached in pairs to the labium and maxilla of insects, and termed respectively *labial* and *maxillary palpi* or feelers. (See figure at *Entomology*.) Palpi are developed also from the oral appendages of spiders and crustacea.

Palpitation consists of repeated attacks of violent and spasmodic action of the heart. When palpitation arises from organic lesion of the heart it is called *symptomatic*, when it is caused by other disorders disturbing the heart's action it is called *functional*. Disorders which may cause palpitation include nervous affections, anæmia, chlorosis, protracted mental emotion, excessive use of stimulants, &c.

Palsy, paralysis, especially a local or less serious form of it. See *Paralysis*.

Palu'dal Diseases (L. *palus*, *palūdis*, a marsh), diseases arising from malaria in marshy places.

Paludan-Müller, FREDERIK, the chief recent poet of Denmark, born in 1809, and educated at Copenhagen University. He began his career as a poet in 1832, and died in 1871. His works include Adam Homo, a humorous didactic poem; Kalanus, an Indian tragedy; Adonis, a poetic romance; Amor and Psyche, a lyrical drama; &c.

Palunpur. See *Pahlanpur*.

Pamiers (pä-mi-ā), a cathedral city of S. France, dep. Ariége. Pop. 8670.

Pamir (pä'mēr), an elevated region of Central Asia, that may be regarded as formed by the meeting of the Himalayan and Thian Shan mountain systems. It forms a plateau having a general elevation of more than 13,000 feet, dominated by still loftier ridges

and summits clothed with eternal snow. There are several small lakes here, and the sources of the Oxus take their rise in the Pamir. The atmosphere is exceedingly dry, the extremes of heat and cold are very great, and great part of the surface is bare and barren. The Kirghiz, however, find a certain amount of pasture for their cattle in summer, and in favoured localities there is a little cultivation. The Pamir, or 'roof of the world,' is celebrated throughout Central Asia, and trade routes have passed across it for ages.

Pam'lico Sound, a shallow lagoon of the United States, on the south-east coast of North Carolina. It is 80 miles long, from 8 to 30 miles wide, and separated from the ocean by long, narrow, sandy islands.

Pampas, a name given to the vast treeless plains of South America in the Argentine Republic, Paraguay, and Uruguay. The pampas are generally covered with grass and other herbage, and in many parts with gigantic thistles, but with the heat of summer the vegetation is much burned up. Shallow lakes or swamps occur in some parts, and parts have the character of a salt steppe. The pampas are roamed over by various tribes of Indians, as well as by herds of wild horses and cattle. In many parts there are now cattle ranches, and large flocks of sheep are also reared.

Pampas-grass (*Gynerium argentĕum*), a grass which grows in the pampas in the

Pampas-grass (*Gynerium argentĕum*).

southern parts of South America. It has been introduced into Europe as an ornamental plant. It has panicles of silvery flowers on stalks more than 10 feet high, and its leaves are from 6 to 8 feet long. The male and female flowers are on separate stalks.

Pampe'ro, a violent wind from the west or south-west which sweeps over the pampas of South America.

Pamphyl'ia, an ancient province of Asia Minor, extending along the Mediterranean from Cilicia on the east to Lycia on the west. It was mountainous, being covered with the ramifications of the Taurus Mountains. Pamphylia never attained any political importance. It was subject successively to Persia, Macedonia, Syria, and Rome, although some Greek colonies for a time maintained their independence.

Pamplo'na, or PAMPELU'NA, a city of Spain, and capital of the province of Navarre or Pamplona, and of the ancient kingdom of Navarre, on the Arga, 78 miles north-west of Saragossa, 197 north-east of Madrid. The town is strongly fortified, and has a cathedral dating from the end of the 14th century. The public fountains are supplied by a magnificent aqueduct. Pop. 25,041.

Pan, a rural divinity of ancient Greece, the god of flocks and herds, represented as

Pan.

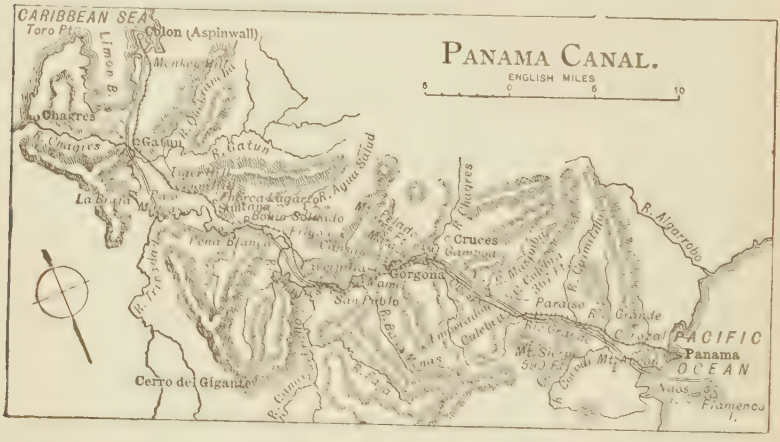
old, with two horns, pointed ears, a goat's beard, goat's tail, and goat's feet. The worship of Pan was well established, particularly in Arcadia. His festivals were called by the Greeks *Lycæa*, and were known at Rome as the *Lupercalia*. Pan invented the syrinx or *pandean* pipes.

Pana, Christian co., Ill., on three railroads; has large trade. Pop. 1890, 5077.

Panamá, a town of the Republic of Colombia, capital of the department of the same name, on the Gulf of Panamá and on the

Pacific coast of the Isthmus of Panamá. The city lies on a tongue of land, across which its streets stretch from sea to sea. The harbour is shallow, but affords secure anchorage. Panamá is chiefly important as the terminus of the interoceanic railway and also of the Panamá Canal (which see). The railway, which has been in operation since 1855, runs across the isthmus from Panamá to Colon or Aspinwall on the Atlantic, and accommodates a large traffic. Pop. 30,000. —The department occupies the Isthmus of Panamá. Agriculture and cattle-breeding are the leading industries, but the climate is generally unhealthy. The prosperity of the department depends largely upon its favourable geographical position, which facilitates transit from the Atlantic to the Pacific. Area, 31,571 square miles. Pop. 285,000.

Panamá, Isthmus of, formerly called the Isthmus of Darien, has a breadth of from 30 to 70 miles, connects North with South America, and separates the Pacific from the Atlantic. The coast is rocky and lofty along



the Caribbean Sea, but low and swampy along the Pacific.

Panamá Canal, a ship canal partly made across the Isthmus of Panamá to connect the Atlantic with the Pacific Ocean. The plan is to follow the course of the railway connecting Colon or Aspinwall on the Atlantic with Panamá on the Pacific, except in places where the bed of the river Chagres will be closely followed. The total length of the projected water-way is 45½ miles, the minimum width is set down as 72 feet, and the average depth 28 feet. The cutting of the Cordilleras, which would necessitate an excavation some 350 feet deep at one part, and the controlling of the flood waters of the Chagres (a river as large as the Seine), are the chief difficulties to be encountered. Operations were commenced in 1881 by a French company under M. de Lesseps. The work of excavation went on more or less continuously till 1887; after an enormous expenditure of money ($266,000,000) the company fell into difficulties, and in 1889 it suspended payment. In November, 1892, criminal proceedings on behalf of the French government were instituted against the leading officers of the canal company, and a committee of inquiry into its affairs was appointed by the chamber of deputies. Prominent French officials also were convicted of bribery.

Panathenæ'a, festivals celebrated at Athens in honour of Athena or Minerva, its tutelary deity. The festivals were of two kinds: the *great Panathenæ*, held every fifth year, and the *lesser Panathenæ*, observed annually. They consisted of athletic and musical contests, followed by sacrifices and feasts. After the *great Panathenæ* there was a solemn procession, in which the *peplos*, a sacred woollen garment woven by young virgins, was carried and placed on the statue of the goddess.

Panax. See *Ginseng.*

Panay, an island of the Philippines, between Mindoro and Negros. It is of triangular form, about 100 miles broad and 100

miles long. It is mountainous but very fertile, and the inhabitants have made considerable progress in civilization. Capital Iloilo. Pop. 799,816.

Pancake, a thin cake of batter fried or baked in a pan. Pancakes are regarded as specially the dish to be eaten on Shrove Tuesday.

Panchatan'tra, a celebrated collection of Indian fables, the source of the Hitopadesa (which see).

Pan'chayat, a native Indian assemblage, properly of five persons, meeting as a court of arbitration, as a jury, or as a committee of the inhabitants of a village, &c., to decide questions interesting to the body generally.

Pan'creas, the sweet-bread of animals; one of the viscera of the abdomen. In men it lies behind the stomach in front of the first and second lumbar vertebræ. The pancreas is an oblong gland about 8 inches long, 1½ inch broad, and from ½ to 1 inch thick. Its right extremity, called the *head*, lies in a bend of the duodenum. The *tail* or left extremity extends to the spleen. The structure of the pancreas is similar to that of the salivary glands. It is composed of lobules throughout. The secretion of this gland is conveyed to the intestine by the *pancreatic duct*. This duct runs from right to left, and is of the size of a quill at its intestinal end. The *pancreatic juice* is a clear, ropy fluid. The functions of the pancreatic juice in digestion are devoted to the conversion of starchy elements into sugar and to the assimilation of fatty matters. It also acts upon albuminoid matters.

Pancsova (pän'cho-vä), a town of Hungary, 8 miles E.N.E. of Belgrade, at the confluence of the Temes with the Danube. It is well built, and carries on a good trade with Turkey. Pop. 17,127.

Panda, or Wah (*Ailurus fulgens*), an

Panda (*Ailurus fulgens*).

animal of the bear family, found in the woody parts of the mountains of Northern India, about equal to a large cat in size. It is chestnut-brown in colour, and dwells chiefly in trees, preying on birds, small quadrupeds, and large insects.

Pandana'ceæ, the Screw-pine family of plants, endogenous trees or shrubs, with flowers unisexual or polygamous; perianth wanting, or consisting only of a few scales. The fruit is either in parcels of fibrous drupes or in berries. The leaves are long, imbricated, and amplexicaul. Aerial roots are a feature of many. The order is divided into two sections, *Pandaneæ* and *Cyclantheæ;* the first with undivided leaves and no perianth, the second with fan-shaped or pinnate leaves, and flowers having a few scales. They are tropical plants, and furnish edible and other useful products. Panamá hats are made from one species. The typical genus is *Pandănus*. See *Screw-pine*.

Pandects, a collection of laws, systematically arranged, from the works of Roman writers on jurisprudence, to which the Emperor Justinian gave the force of law, A.D. 533. See *Corpus Juris*.

Panderpur, Pandharpur, a town in Bombay, India, held in great reverence by the Brahmins for its temple of Vishnu. Pop. 16,910.

Pandi'on. See *Osprey*.

Pandit, or Pundit, a learned Brahman; one versed in the Sanskrit language, and in the sciences, laws, and religion of the Hindus.

Pan'doors, the name given to a body of Hungarian soldiers, who, about the middle of last century, were dreaded for their savage mode of warfare.

Pando'ra, in Greek mythology, the first woman on earth, sent by Zeus to mankind in vengeance for Prometheus's theft of heavenly fire. Each of the gods gave her some gift fatal to man. According to later accounts the gods gave her a box full of blessings for mankind, but on her opening the box they all flew away, except hope. Epimetheus, brother of Prometheus, married her.

Panel, a schedule or roll of jurors. (See *Jury*.) In Scottish law, the prisoner at the bar is the *panel*.

Pan'golin, the name applied to the Scaly Ant-eaters (Manidæ), forming a family of the Edentate order of mammals. They occur in Southern Asia and Africa; have the body invested by a covering of imbricated scales of horny material; vary from 3 to 4 feet in length, and defend themselves by assuming the form of a ball. The tail is

long, and the feet are provided with strong curved claws, which assist the animals in burrowing. The jaws are destitute of teeth,

Four-toed Pangolin (*Manis tetradactyla*).

and the tongue is of great length. The food consists of insects. The four-toed pangolin (*Manis tetradactyla*) inhabits W. Africa.

Panic, the name of some species of millet (*Panicum*).

Panicle, a form of inflorescence differing from a raceme in having a branched instead of a simple axis. See *Inflorescence*.

Pânini, a celebrated Indian grammarian who is supposed to have lived not later than the 4th century B.C. His Sanskrit grammar is highly scientific, but extremely abstruse.

Pan'iput, a town of India, in the Punjab, 50 miles north by west of Delhi; surrounded by an old wall. Pop. 25,022.

Panizzi, Sir Anthony, principal librarian of the British Museum, born at Brescello, Modena, in 1791. Having engaged in revolutionary movements he came to England in 1822, and became professor of Italian in University College in 1828. In 1837 he was appointed keeper of printed books in the British Museum, and succeeded to the principal librarianship in 1856. He conceived and designed the plan for the new library and reading-room, which is at once novel and very convenient. He died 1879.

Panjim. See *Goa*.

Panjnad. See *Punjnud*.

Panna. See *Punnah*.

Panniar. See *Punniar*.

Panno'nia, the ancient name of a district of Europe, comprising the eastern parts of Austria, Carinthia, Carniola, the part of Hungary between the Danube and the Save, Slavonia, and parts of Croatia and Bosnia. The Pannonians were finally subdued by Tiberius, A.D. 8, and Pannonia became a Roman province. It had numerous towns, of which Vindobona (Vienna) was the chief.

Panompenh. See *Pnom-penh*.

Panora'ma (from Gr. *pan*, all, the whole, and *horāma*, view), a painting in which all the objects that can be seen naturally from one point are represented on the concave side of a whole or half cylindrical wall, the point of view being the axis of the cylinder. A painting of this kind when well mounted produces a complete illusion, and no other method is so well calculated to give an exact idea of an actual view. See *Diorama*.

Pan'slavism, a general name for the efforts or aspirations of the Slavonic races in Europe, or some of them, after union, including the Russians, Czechs, Servians, Bulgarians, &c.

Pan'tagraph. See *Pantograph*.

Pantellaria, a fertile volcanic island of the Mediterranean, 50 miles E.S.E. of Cape Bon in Africa, and 80 miles south-west of Sicily, of which it is a dependency; length, north to south, 9 miles; breadth, 6 miles. It produces wine, olives, &c. Pop. 7315.

Pan'theism (Gr. *pan*, all, and *theos*, god), in philosophy, the doctrine of the substantial identity of God and the universe, a doctrine that stands midway between atheism and dogmatic theism. The origin of the idea of a God with the theist and the pantheist is the same. It is by reasoning upon ourselves and the surrounding objects of which we are cognizant that we come to infer the existence of some superior being upon whom they all depend, from whom they proceed, or in whom they subsist. Pantheism assumes the identity of cause and effect. Matter, not less than mind, is with it the necessary emanation of the Deity. The unity of the universe is a unity which embraces all existing variety, a unity in which all contradictions and all existing and inexplicable congruities are combined. Pantheism has been the foundation of nearly all the chief forms of religion which have existed in the world. It was represented in the East by the Sankhya of Kapila, a celebrated system of Indian philosophy. The Persian, Greek, and Egyptian religious systems were also pantheistic. Spinoza is the most representative pantheist of modern times. A twofold division of pantheism has been proposed:—1. That which loses the world in God, one only being in whose modifications are the individual phenomena. 2. That which loses God in the world and totally denies the substantiality of God.

Pan'theon (or pan-thē'on; Greek, *pan*, all, *theos*, god), a celebrated temple at Rome, built in 27 B.C. by Marcus Agrippa. It is a

large edifice of brick, built in circular form, with a portico of lofty columns. It has the finest dome in the world (142½ feet internal diameter, 143 feet internal height), and its portico is almost equally celebrated. It is now a church, and is known as Santa Maria Rotonda. Raffael and other famous men are buried within its walls. The Pantheon in Paris, for some time the church of St. Geneviève, is a noble edifice with a lofty dome, devoted to the interment of illustrious men.

Panther (*Felis pardălis*), one of the Felidæ or Cat tribe, of a yellow colour, diversified with roundish black spots, a native of Asia and Africa. The panther is now supposed to be identical with, or a mere variety of the leopard. (See *Leopard.*) The name panther (in vulgar language *painter*) is given to the puma in America.

Pan'tograph, also called PANTAGRAPH and PENTAGRAPH (from Gr. *pan*, all, and *graphein*, to write or delineate), an instrument consisting of four limbs joined together by movable joints, and so contructed that by means of it maps and plans may be copied mechanically either on the scale on which they are drawn or on an enlarged or reduced scale. It is made in a variety of forms.

Pan'tomime, properly a theatrical representation without words, consisting of gestures, generally accompanied by music and dancing. The modern Christmas pantomime is a spectacular play of a burlesque character, founded on some popular fable, and interspersed with singing and dancing, followed by a harlequinade, the chief characters in which are the harlequin, pantaloon, columbine, and clown, which may be traced back to the Italian pantomime, although their present development is almost entirely modern.

Pan'uco, a town of Mexico, state of Vera Cruz, on the Panuco, 27 miles above its mouth at Tampico. Pop. 5000.

Pa'oli, PASQUALE DE, a Corsican patriot, born in 1726, died in 1807. In 1755 he was appointed captain-general by his countrymen, who were struggling for their independence against Genoa. He organized the government and military resources of the island, and maintained a protracted and generally successful struggle with the Genoese. The latter being unable to subdue the island, sold it to France in 1768. After a brief struggle Paoli was obliged to yield, and took refuge in England. After the Revolution of 1789 he was recalled by the National Assembly, and made lieutenant-general of Corsica. Disagreements with the Democratic party in France soon led him to throw himself into the arms of England, and through his influence the crown was offered to George III. Subsequently he withdrew to England, and received a pension from the British government.

Papa, a town of Hungary, 75 miles west of Budapest. It has a castle of the Esterhazy family, a Protestant college, &c. Pop. 14,654.

Papa, the Latin form of *Pope*, the name given by the Greek and Armenian churches to all their priests.

Papacy. See *Popes.*

Papal States, the name given to that portion of Central Italy of which the pope was sovereign by virtue of his position. The territory extended irregularly from the Adriatic to the Mediterranean, and latterly comprised an area of 15,289 square miles with 3,126,000 inhabitants. Rome was the capital. The foundation of the Papal States was laid in 754, when Pepin le Bref presented the exarchate of Ravenna to Stephen II., bishop of Rome. Benevento was added in 1053, and in 1102 Matilda of Tuscany left Parma, Modena, and Tuscany to the pope. In 1201 the Papal States were formally constituted an independent monarchy. Subsequently various territories were added to or subtracted from the pope's possessions, which were incorporated with France by Napoleon in 1809, but restored to the pope in 1814. A revolution broke out in Rome in 1848, and the pope fled to Gaeta, but he was reinstated by French troops, and Rome was garrisoned by French soldiers until 1870. In the meantime one state after another threw off its allegiance to the pope and joined the kingdom of Italy, and when the French left Rome in Aug. 1870, King Victor Emanuel took possession of the city, declared it the capital of Italy, and thus abolished the temporal power of the pope.

Papant'la, a town of Mexico, in the state of Vera Cruz, about 120 miles north-east of Mexico. It indicates its ancient splendour by its massive ruins. Pop. 3000.

Papa'ver. See *Poppy.*

Papavera'ceæ, the poppy family of plants, an order belonging to the polypetalous division of the exogens. It contains about 160 species, mostly members of the northern temperate regions. They are smooth herbs, rarely shrubs, with alternate, often cut leaves, and solitary handsome flowers. The poppies are the most familiar members.

Papaw' (*Carĭca Papāya*, natural order Papayaceæ), a tree of South America, now widely cultivated in tropical countries. It grows to the height of 18 or 20 feet, with a soft herbaceous stem, naked nearly to the top, where the leaves issue on every side on long foot-stalks. Between the leaves grow the flower and the fruit, which is of the size of a melon. The juice of the tree is acrid and milky, but the fruit when boiled is eaten with meat, like other vegetables. The juice of the unripe fruit is a powerful vermifuge; the powder of the seed even answers the same purpose. The juice of the tree or its fruit, or an infusion of it, has the singular property of rendering the toughest meat tender, and this is even said to be effected by hanging the meat among the branches.—The papaw of North America is *Asimĭna trilŏba*, nat. order Anonaceæ; it produces a sweet edible fruit.

Papaw (*Carĭca Papāya*).

Paper, a thin and flexible substance, manufactured principally of vegetable fibre, used for writing and printing on, and for various other purposes. Egypt, China, and Japan are the countries in which the earliest manufacture of paper is known to have been carried on. The Egyptian paper was made from the papyrus (whence the word *paper*), but this was different from paper properly so called. (See *Papyrus*.) According to the Chinese the fabrication of paper from cotton and other vegetable fibres was invented by them in the 2d century B.C. From the East it passed to the West, and it was introduced into Europe by the Arabs. Spain is said to have been the first country in Europe in which paper from cotton was made, probably in the 11th century; and at a later period the manufacture was carried on in Italy, France, and Germany. It cannot now be ascertained at what time linen rags were first brought into use for making paper; but remnants of Spanish paper of the 12th century appear to indicate that attempts were made as early as that time to add linen rags to the cotton ones. The earliest paper manufactory known to have been set up in England was that of John Tate, at Stevenage, in Hertfordshire, about 1495. The manufacture in England, however, long remained in a backward state, so that until late in the 18th century the finer qualities of paper were imported from France and Holland. The first paper-making company in Scotland was established in 1695.

After the introduction into Europe of cotton and linen rags as materials for paper-making, other vegetable fibres were for many centuries almost entirely given up, rags being cheaper than any other material. It was only about the close of the 18th century that paper-manufacturers again began to turn their attention to the possibility of using vegetable fibres as substitutes for rags, one of the earliest signs of the new departure being a work containing sixty specimens of paper made from different vegetable materials, published in 1772 by a German named Schöffer or Schäffers. Straw, wood, and esparto are the chief vegetable fibres which have been found most suitable for the purpose.

The process by which paper is produced depends on the minute subdivision of the fibres, and their subsequent cohesion; and before the making of the paper properly begins the rags or other materials have to be cleaned from impurities, boiled in a strong lye, and reduced by special machinery to the condition of a thin pulp, being latterly bleached with chloride of lime. It is at this stage of the manufacture that size is added, and toned and other coloured papers have the colouring matter introduced. The pulp, composed of the fibrous particles mixed with water, is now ready to be made into paper.

Paper is made either by the hand or by machinery. When it is made by the hand the pulp is placed in a stone vat, in which revolves an agitator, which keeps the fibrous particles equally diffused throughout the mass; and the workman is provided with a *mould*, which is a square frame with a fine wire bottom, resembling a sieve, of the size of the intended sheet. These moulds are sometimes made with the wires lying all one way, except a few which are placed at intervals crosswise to bind the others together, and sometimes with the wires crossing each other as in a woven fabric. Paper made with moulds of the former kind is said

to be *laid*, and that made with those of the latter kind *wove*. The so-called *water-mark* on paper is made by a design woven in wire in the mould. Above the mould the workman places a light frame called a *deckle*, which limits the size of the sheet. He then dips the mould and deckle into the pulp, a portion of which he lifts up horizontally between the two, gently shaking the mould from side to side, to distribute the fibres equally and make them cohere more firmly, the water, of course, draining out through the wire meshes. The sheets thus formed are subjected to pressure, first between felts, and afterwards alone. They are then *sized*, pressed once more, and hung up separately on lines in a room to dry. The freedom with which they are allowed to contract under this method of drying gives to hand-made paper its superior firmness and compactness. After drying they are ready for making up into quires and reams, unless they are to be glazed, which is done by submitting the sheets to a very high pressure between plates of zinc or copper.

In paper-making by machinery, a process patented in France in the end of last century, the pulp is placed in wooden or iron vessels at one end of the machine, and is kept constantly agitated by a revolving spindle with arms attached to it. From these the pulp passes to the *pulp-regulator*, by which the supply of pulp to the machine is kept constant, thence through sand-catchers and strainers till it reaches the part of the machine which corresponds to the hand-mould. This consists of an endless web of brass wire-cloth, which constantly moves forward above a series of revolving rollers, while a vibratory motion from side to side is also given to it, which has the same object as shaking the mould in making by the hand. Meanwhile its edges are kept even by what are called *deckle* or *boundary straps* of vulcanized india-rubber. At the end of the wire-cloth the pulp comes to the *dandy-roll*, which impresses it with any mark that is desired. The fabric is now received by the felts, also, like the wire part of the machine, an endless web, the remaining water being pressed out in this part of the machine by four or five consecutive rollers. If intended for a printing-paper, or any other kind that requires no special sizing, it is dried by being passed round a succession of large hot cylinders, with intermediate smoothing rolls. It is then rendered glossy on the surface by passing between polished cast-iron rollers called *calenders*, and is finally wound on a reel at the end of the machine, or submitted to the action of the cutting machinery, by which it is cut up into sheets of the desired size. If the paper is to be sized, the web, after leaving the machine, is passed through the sizing-tub, and is then led round a series of large skeleton drums (sometimes as many as forty) with revolving fans in the inside, by the action of which it is dried. If the paper were dried by hot cylinders after the sizing, there would be a loss of strength in consequence of the drying being too rapid. After being dried the paper is glazed by the *glazing-rollers*, and then cut up. In some cases the sizing is done after the paper has been cut into sheets, these being then hung up to dry on lines, like hand-made paper, acquiring in the process something of the same hardness and strength. The total length of a paper-machine, from the beginning of the wire-cloth to the cutters, is frequently more than 100 feet.

Paper was made from straw at the beginning of the present century, and the material is now largely used. The chief and best use of straw is to impart stiffness to common qualities. To prevent brittleness, however, it is necessary to destroy the silica contained in the straw by means of a strong alkali. Paper is now also made entirely from wood, previously reduced to a pulp. Esparto or Spanish grass, exported largely from Spain, Algeria, Tripoli, Tunis, and other countries, has been applied to paper-making only in comparatively recent years, but has risen rapidly into favour. The use of rushes for paper-making belongs to America, and dates from the year 1866. The root of the lucern has also been applied with success in France of late years to the fabrication of paper. Various mineral substances are sometimes added to the fibrous materials necessary to make paper, such as a silicate of alumina called Lenzinite, kaolin or porcelain earth, and artificial sulphate of barium (permanent white). The first two substances have a tendency to diminish the tenacity of the fabric; the last is thought by some manufacturers to be beneficial to printing-papers, enabling them to take a clearer impression from the ink.

Blotting and filtering paper are both made in the same way as ordinary paper except that the sizing is omitted. Copying paper is made by smearing writing paper with a composition of lard and black-lead,

which, after being left alone for a day or so, is scraped smooth and wiped with a soft cloth. Incombustible paper has been made from asbestos, but since fire removes the ink from a book printed on this material, the invention is of no utility, even though the paper itself be indestructible. Indelible cheque paper has been patented on several occasions. In one kind of it the paper is treated with an insoluble ferrocyanide and an insoluble salt of manganese, and is sized with acetate of alumina instead of alum. Parchment paper or vegetable parchment is made from ordinary unsized paper by treatment with sulphuric acid or oil of vitriol and ammonia. The so-called rice paper is not an artificial paper, but a vegetable membrane imported from China, and obtained apparently from the pith of a plant called *Aralia papyrifera*. Tissue paper is a very thin paper of a silky softness used to protect engravings in books and for various other purposes. Tracing paper is made from tissue paper by soaking it with Canada balsam and oil of turpentine or nut-oil and turpentine.

In recent times the uses of paper have greatly multiplied. Besides being largely employed for making collars, cuffs, and other articles of dress, it is sometimes used for making huts in the backwoods of America; for making boats, pipes, and tanks for water; cuirasses to resist musket-bullets, wheels for railway-carriages, and even bells and cannons. Paper wheels have been used for some of Pullman's railway saloon cars in America, and have worn out one set of tyres. Cannons made of paper have actually been tried with success. In the production of paper England, America, Germany, and France take the lead.

In England a tax or duty on paper was imposed in the reign of Queen Anne, and was not repealed till 1861. At this time the duty was levied according to the value, but latterly by weight. So long as it was payable according to size, paper as it proceeded from the mill, was cut with rigorous exactness into certain standard sizes, distinguished by different names. These were frequently departed from when the duty was made payable according to weight, but a number of sizes distinguished by different names are still made, such as *pot*, *foolscap*, *post*, *royal*, *imperial*, &c.

Paper-hangings, ornamental papers often pasted on the walls of the rooms in dwelling-houses. The staining of papers for this purpose is said to be a Chinese invention, and was introduced into France at the beginning of the 17th century. It is now common everywhere, but more especially in France, England, and the United States. Most of the processes in paper-staining are now usually done by machinery; but there is still much hand-work in the finer qualities, especially those produced in France. The first operation is that of grounding, which consists in covering the surface with some dull colour, the tint of which varies. Papers with a glazed ground are usually glazed immediately after receiving the ground tint. The designs on the surface of paper-hangings are applied by hand processes and machines exactly similar to those employed in calico-printing. (See *Calico-printing*.) *Flock-paper* is made by printing on the parts which are to receive the flock a mixture of strong oil boiled with litharge and white-lead, to render it drying. The coloured flock is then sprinkled on the paper, and adheres to the parts to which the mixture has been applied.

Paper Money. See *Currency*.

Paper-mulberry. See *Mulberry*.

Paper-nautilus. See *Argonaut*.

Paphlago'nia, the former name of a mountainous district in the north of Asia Minor, between Bithynia on the west and Pontus on the east, separated from the latter by the Halys. On the coast was the Greek city Sinope. Paphlagonia was first subdued by Crœsus, king of Lydia, and afterwards formed part of the Persian Empire, until its satraps made themselves independent. It was ruled by native princes from 316 B.C. until subdued by Mithridates (63 B.C.), on whose overthrow the district was incorporated with the Roman Empire.

Pa'phos, the name of two ancient cities in Cyprus—Old Paphos, a little more than a mile distant from the south-western coast, upon a height; and New Paphos (modern *Baffa*), 7 or 8 miles to the north-west of Old Paphos, situated on the sea-shore. The first was famous in antiquity for the worship of Aphroditē (Venus). At New Paphos St. Paul preached before the proconsul Sergius.

Pa'pias, a Christian writer of the age succeeding that of the apostles. He is described by Irenæus as a 'hearer of John and a companion of Polycarp,' and was martyred at Pergamus in 163 A.D. He was the author of five books on the Sayings of our Lord, all lost, except a few valuable fragments, which give important information as to the early

traditions regarding the New Testament: *e.g.* that Matthew's Gospel was believed to have been written in Hebrew, and that the evangelist Mark was the interpreter (*hermeneutēs*) of Peter, and wrote to his dictation.

Papier Mâché (pap-yā mä-shā; Fr. 'mashed paper'), a substance made of cuttings of white or brown paper boiled in water, and beaten in a mortar till they are reduced into a kind of paste, and then boiled with a solution of gum Arabic or of size to give tenacity to the paste. Sulphate of iron, quicklime, and glue or white of egg, are sometimes added to enable the material to resist the action of water, and borax and phosphate of soda to render it to a great extent fire-proof. It is used for making all sorts of useful and ornamental articles that can be formed in moulds. Another variety of papier mâché is made by pasting or gluing sheets of paper together, and pressing them when soft into the form which it is desired to give them.

Papil'io, a genus of butterflies (Lepidoptera), containing some well-known species, as the swallow-tailed butterfly (*Papilio machāon*), the peacock butterfly (*P. Io*), &c.

Papiliona'ceæ, a division of plants, forming a sub-order of the Leguminosæ (which see), distinguished by the resemblance of the superior petals of their flowers to the extended wings of a butterfly (Latin, *papilio*). The best-known examples are the pea and bean, which are the typical plants of this division.

Papillæ, the name applied in physiology to small or minute processes protruding from the surface of the skin, or of membranes generally, and which may possess either a secretory or other function. The human skin exhibits numerous papillæ, with divided or single extremities, and through which the sense of touch is chiefly exercised. The papillæ of the tongue are important in connection with the sense of taste. See *Skin* and *Tongue*.

Papin (pä-paŋ), Denys, natural philosopher, born in Blois, in France, in 1647. Having visited England he was in 1681 admitted a fellow of the Royal Society. The revocation of the Edict of Nantes preventing him from returning to his native country, he settled at Marburg, in Germany, in 1687, as professor of mathematics, retaining this charge till 1707. He is believed to have died in Germany about 1714. He is best known for the invention denominated Papin's Digester (see *Digester*).

Papinia'nus, Æmilius (Papinian), Roman lawyer, born under Antoninus Pius, about 140 A.D. His learning and integrity won him the first offices of state, and he was ultimately chosen prefect of the prætorian guards under the Emperor Septimius Severus, whom he accompanied to Britain. The emperor Caracalla caused him to be executed in 212. In the Pandects are 595 excerpts taken from his works.

Pa'pion, *Cynocephălus sphinx*, a species of dog-headed baboon, akin to the mandril. It was held in great reverence in Egypt, selected individuals being kept near the temples, in the caves of which their mummied forms have been often found.

Pappenheim, Gottfried Heinrich, Count of, imperial general in the Thirty Years' war, born in 1594 at Pappenheim, in Bavaria. He distinguished himself in the battle of Prague as colonel, in 1620; in 1623–25 served in Lombardy as commander of a regiment of cuirassiers (the Pappenheim dragoons). In 1626 he conquered, with the assistance of the Bavarians, 40,000 peasants in Upper Austria, and in 1630 joined Tilly, who ascribed the loss of the battle of Leipzig in 1631 to his impetuosity. He appeared on the field of Lützen on the side of Wallenstein, but was mortally wounded, and died the day after the battle, 1632.

Pappus, in botany, the feathery appendage that crowns many single-seeded seed-vessels, for example, the down of the dandelion.

Pappus, Alexandrinus, mathematician, flourished at Alexandria in the 4th century after Christ. All his works appear to have perished, except portions of his Mathematical Collections, which possess great value, and have sufficed to found his fame. They include geometrical problems and theorems, a treatise on mechanics, &c.

Papu'a. See *New Guinea*.

Papy'rus (*Papȳrus antiquōrum*, or *Cypĕrus papȳrus*), an aquatic plant belonging to the natural order Cyperaceæ or sedges. It has acquired celebrity from furnishing the paper of the ancient Egyptians. The root is very large, hard, and creeping; the stem is several inches thick, naked, except at the base, 8 to 15 or more feet high, triangular above, and terminated by a compound, wide-spreading, and beautiful umbel, which is surrounded with an involucre composed of eight large sword-shaped leaves. The little scaly spikelets of inconspicuous flowers are placed at the extremity of the rays of this

umbel. Formerly it was extensively cultivated in Lower Egypt, but is now rare there. It is abundant in the equatorial regions of Africa in many places, and is found also in Western Africa and in Southern Italy. The inhabitants of some countries where it grows manufacture it into various articles, including sail-cloth, cordage, and even wearing apparel and boats. Among the ancient Egyptians its uses were equally numerous, but it is best known as furnishing a sort of paper. This consisted of thin strips carefully separated from the stem longitudinally, laid side by side, and then covered transversely by shorter strips, the whole being caused to adhere together by the use of water and probably some gummy matter. A sheet of this kind formed really a sort of mat. In extensive writings a number of these sheets were united into one long roll, the writing materials being a reed pen and ink made of animal charcoal and oil. Thousands of these papyri or papyrus rolls still exist (many of them were found in the ruins of Herculaneum), but their contents, so far as deciphered, have only been of moderate value.

Egyptian Papyrus (*Papyrus antiquōrum*).

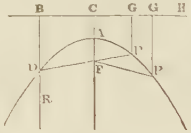
Par (Latin, 'equal') is used to denote a state of equality or equal value. Bills of exchange, stocks, &c., are *at par* when they sell for their nominal value; *above par* or *below par* when they sell for more or less.

Para, a small Turkish and Egyptian coin, of copper or copper and silver, the fortieth part of a Turkish piastre (grush). Value, from $\frac{1}{18}$ to $\frac{1}{16}$ of an English penny.

Pará, or BELEM, a city and seaport in Brazil, capital of the province of Pará, on the right bank of the estuary of the Pará, (or of the River Tocantins). The principal buildings are the governor's palace, the cathedral, and the churches of Santa Anna and São João Baptista. It is the seat of the legislative assembly of the province. The port, defended by forts, is capable of admitting vessels of large size. The principal exports are caoutchouc, cacao, Brazil-nuts, copaiba, rice, piassava, sarsaparilla, annotto, cotton, &c. Pop. estimated at from 55,000 to 60,000.—The province of Pará, the most northerly in Brazil, comprises an area of 443,790 square miles on both sides of the lower Amazon, and consists chiefly of vast alluvial plains connected with this river and its tributaries. These latter comprise the Tapajos and the Xingu, besides many others; the Tocantins being another great stream from the south. The province possesses immense forests, and is extremely fertile, but there is little cultivation, the inhabitants being fewer than one to the square mile. The trade centres in the capital. It is now facilitated by steam-boats navigating the Amazon and Tocantins. Pop. 443,653.

Parable, a short tale in which the actions or events of common life are made to serve as a vehicle for moral lessons. The parable is a mode of teaching peculiarly adapted to the eastern mind, and was common among the Jews before the appearance of Christ. It is exemplified in the Old Testament in the parable addressed by Nathan to David (2 Sam. xii.), and there are frequent examples of it in the Talmud.

Parab'ola, one of the curves known as conic sections. If a right cone is cut by a plane parallel to a slant side, the section is a parabola. It may also be defined as the curve traced out by a point which moves in such a way that its distance from a fixed point, called the 'focus,' is always equal to its perpendicular distance from a fixed straight line, called the 'directrix.' In the figure BH is the directrix and F the focus, while P is a point that moves so that the perpendicular GP is always equal to the line PF; the curve PAD described by a point so moving is a parabola. The line FAC through the focus is the axis or principal diameter; any line parallel to it as BDR is a diameter. The path of a projectile in vacuo, when not a vertical straight line, is parabolic.



Parabola.

Parabo'ni, in the early Christian church, a class of men whose chief duty was to attend on the sick and diseased.

Paracel'sus, or PHILIPPUS AUREOLUS THEOPHRASTUS BOMBASTUS VON HOHENHEIM, empiric and alchemist, born at Einsiedeln, in the canton of Schwyz, in Switzerland, in 1493. Dissatisfied with the means of acquiring knowledge in his native country, he

travelled over the greater part of Europe, everywhere seeking to add to his knowledge. In the course of his travels he became acquainted with remedies not in common use among physicians (probably preparations of mercury), by means of which he performed extraordinary cures, and obtained great reputation. In 1526 he accepted the chair of medicine offered him by the magistrates of Basel, and lectured there till the spring of 1528. The failure of a lawsuit, and the consequent quarrel with the judges, led him to resume his wandering life, at first accompanied by his pupil Oporinus, who, however, disgusted with his violence and intemperance, at length left him. He died at the hospital of St. Sebastian at Salzburg in 1541. For a long time he was regarded as little better than a charlatan, but he enriched science, particularly chemistry and medicine, with some valuable discoveries, and, indeed, is sometimes looked upon as the founder of modern therapeutics.

Parachute (pa'ra-shöt), an apparatus of an umbrella shape and construction, usually about 20 or 30 feet in diameter, attached to balloons, by means of which the aeronaut

Parachute (Garnerin's Parachute descending).

may descend slowly from a great height. It is shut when carried up, and expands of itself when the aeronaut begins to descend; but it is not altogether to be depended on, and accidents in connection with its use have been frequent. The earliest mention of a machine of this kind is in a MS. describing experiments made with one in 1617. In 1783 the French physician Lenormand made several further experiments at Montpellier; and shortly after the machine became well known through the descents of Blanchard in Paris and London. See *Aeronautics*.

Paraclete (Gr. *paraklētos*, a counsellor, comforter), the Comforter, the Holy Ghost (John xiv. 16).

Paradise, the garden of Eden. The word is originally Persian, and signifies a park. It was introduced into the Greek language in the form *paradeisos* by Xenophon, and has been introduced into modern languages as a name for the garden of Eden (and hence of any abode of happiness) through its use in that sense in the Septuagint.

Paradise, Bird of. See *Bird of Paradise*.

Par'adox, a statement or proposition which seems to be absurd, or at variance with common sense, or to contradict some previously-ascertained truth, though, when duly investigated, it may prove to be well founded.

Paradox'ure (*Paradoxūrus typus*), an animal of the civet family (Viverridæ), common in India, and known also as the palm-cat from its habit of climbing palm-trees to eat their fruit. It can curl its tail into a tight spiral.

Par'affin, a solid white substance of a waxy appearance which is separated from petroleum and ozokerit, and is also largely obtained by the destructive distillation of various organic bodies, such as brown coal or lignite, bituminous coal, shale, &c. In Scotland the paraffin industry is highly important. The process generally consists in heating bituminous shale in iron retorts at a low red heat; condensing the tarry products, and purifying these by distillation, washing successively with soda, water, and acid, and again distilling. Those portions of the oil which solidify in the final distillations are collected separately from the liquid portions, washed with soda and acid, and crystallized or again distilled. The partially purified paraffin (called *paraffin scale*) is now again treated with acid, allowed to solidify, submitted to the action of centrifugal machines, and finally strongly pressed in order to remove any liquid oil which may still adhere to it. The refined paraffin is largely manufactured into candles, which may be either white or coloured, and may be mixed with a certain quantity of wax, &c. The liquid oils obtained in the process come into commerce under the general name of paraffin-oil, the lighter oils being used for illuminating and the heavier for lubricating purposes. Paraffin has received its name (Lat. *parum*, little, *affinis*, akin) on account of its remarkable indifference to or want of affinity with other substances. Besides being

used for candles, it is used for vestas and tapers, for water-proofing, sizing, and glazing fabrics, as an electric insulator, as a coating for the inside of beer barrels, &c.

Paraguay (pä′rä-gwī), a republic of South America, surrounded by the Argentine Republic, Brazil, and Bolivia; separated from the first by the River Paraná, its tributary the Paraguay, and the Pilcomayo, a tributary of the latter; from Brazil by the Paraná, a range of hills, and the Apa, a tributary of the Paraguay; area, 98,000 square miles. The whole surface belongs to the basins of the Paraguay and Paraná, numerous tributaries of which intersect the country. Along the Paraguay and in the south, adjoining the Paraná, are extensive swampy tracts; westward of the Paraguay the country is little known. Elsewhere the surface is well diversified with hill and valley, and rich alluvial plain. The climate is agreeable, the mean annual temperature being about 75°. The natural fertility of the soil is shown by a vegetation of almost unequalled luxuriance and grandeur. In the forests are found at least sixty varieties of timber-tree, besides dye-woods, gums, drugs, perfumes, vegetable oils, and fruits. Many of the hills are covered with the *yerba maté* or Paraguay tea. (See *Maté.*) The larger plains are roamed over by immense herds of cattle, which yield large quantities of hides, tallow, bones, &c.; and on all the cultivated alluvial tracts sugar-cane, cotton, tobacco, rice, maize, &c., are raised in profusion. In 1891 the imports were valued at $1,802,000, largely from Britain; the exports were valued at more than $3,166,000, and comprised mainly maté and tobacco. Asuncion, the capital, Paraguari, and Villa Rica are connected by a railway about 90 miles long. Large river-steamers ascend the Paraná and the Paraguay far above Asuncion.

Paraguay was originally a Spanish colony, the first settlement being made in 1535. In 1608 a number of Spanish Jesuits established a powerful and well-organized government, which lasted till 1758, when it was overthrown by the Brazilians and Spaniards. Early in the present century its isolated position enabled it by a single effort to emancipate itself from Spanish rule. Dr. Francia, secretary to the revolutionary junta in 1811, was elected consul, but exchanged the name for that of dictator in 1814, and thenceforward, by a rigorous system of espionage and the strict prohibition of all intercourse with other nations, retained his position till his death in 1840 at the age of eighty-four. In 1844 Don Carlos Antonio Lopez was elected president for ten years, and soon after the country was declared free and open both to foreigners and foreign commerce. Don Carlos Lopez remained president of Paraguay till his death in 1862, when he was succeeded by his son Don Francisco, who concluded treaties of commerce with England, France, the U. States, Brazil, &c., and did all in his power to promote the growth of agriculture and industry in the land. But a disastrous war with Brazil and the Argentine Republic, which broke out in 1864 and only closed with the death of Lopez in 1870, caused the death of far the greater portion of the male adults and entirely checked the progress of Paraguay. A popular constitutional government has since been established, and the state is now making rapid progress in population and prosperity. The people are largely half-breeds or of Indian blood. Before the war the population is said to have been over 1,000,000; after the war not more than a tenth of this. The census of 1886 made it 329,688, not including about 120,000 Indians. Pop. 1890, about 476,000.

Paraguay, a river of S. America, which rises in the Brazilian province of Matto Grosso, takes a course generally southwards, and joins the Paraná at the south-west angle of the state of Paraguay after a course of some 1300 miles. It receives the Pilcomayo, Vermejo, and other large rivers, and is a valuable highway of trade to Paraguay and Brazil.

Paraguay Tea. See *Maté.*

Parahyba (pä-rä-ē′bä), a maritime province of Brazil, between Rio-Grande-do-Norte on the north and Pernambuco on the south; area, 28,846 square miles. Much of the soil is of a sandy texture, though there are also extensive fertile tracts and large forests. Periodical droughts occur. Pop. 496,618.—The capital, PARAHYBA, is a cathedral city situated on the river of the same name, about 11 miles from its mouth. The harbour is much frequented by coasting vessels. Pop. 1890, 40,000.

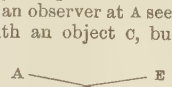
Parakeets, or PARROQUETS, a sub-family or group of the Parrots, characterized by their generally small size and their long tail-feathers. The islands of the Eastern Archipelago form the chief habitat of these birds, but species also occur in India and Australia. Amongst the most familiar forms are the rose-ringed and Alexandrine parakeets. The former (*Palæornis torquātus*), found in

India and on the eastern coasts of Africa, has a bright-green body and a pink circle round the neck. The Alexandrine parakeet

Rose-ringed Parakeet (*Palæornis torquatus*).

(*P. Alexandri*) of India is a nearly allied species. These birds may be taught to speak with distinctness. The ground parakeets of Australia live amongst the reeds and grass of swamps, generally in solitary pairs. The common ground parakeet of Australia (*Pezoporus formōsus*) possesses a green and black plumage, the tail being similarly coloured, and the body-feathers having each a band of dark-brown hue. The grass parakeets of Australia, of which the small warbling parakeet (*Melopsittăcus undulātus*) is a good example, inhabit the central flat lands of Australia, and feed on the seeds of the grasses covering the plains. They perch on the eucalypti or gum-trees during the day, and the nests are situated in the hollows of these trees. Contrary to most parrots they have an agreeable voice.

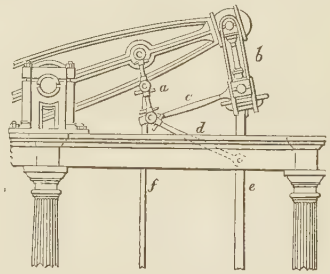
Par'allax, the apparent change of place which bodies undergo by being viewed from different points. Thus an observer at A sees an object B in line with an object C, but when he moves to D it is in line with E, and seems to have gone backward. The



term has become technical in astronomy, and implies the difference of the apparent positions of any celestial object when viewed from the surface of the earth and from the centre of either the earth or the sun. The term 'parallax' is also employed to denote the non-coincidence of the cross fibres in a telescope with the focus of the eye-glass.

Parallel Lines, in geometry, straight lines in the same plane which never meet, no matter how far produced.

Parallel Motion, a mechanical contrivance employed by Watt to communicate the alternate pushes and pulls of the piston-rod of a steam-engine to the end of a vibrating beam, and which prevents the action of forces tending to destroy the right-line motion of the piston-rod. The motion given to the end of the rod is not accurately in a straight line, but it is very nearly so. Watt's parallel motion is still employed in all stationary beam-engines. In marine beam-engines the



Part of Beam of Condensing Engine.
a b c d, Parallel motion. *e*, Piston-rod. *f*, Pump-rod.

arrangement employed differs somewhat in form, but is the same in principle as Watt's contrivance.

Parallelogram of Forces, an important dynamical principle, deduced by Newton, which may be stated thus: If two forces acting in different directions on a particle at the same time be represented in magnitude and direction by two straight lines meeting at the particle, their resultant effect in giving motion to the particle is that of a force represented in magnitude and direction by the diagonal (terminating in the particle) of the parallelogram, of which the two former lines are two sides.

Parallels, in military operations, are trenches formed by besiegers to cover their assault, being so named because they generally run parallel with the outlines of the fortress assailed. The communication from one to the other is effected by means of ditches formed in zigzag, so that they may not be raked by the fire of the fortress. Vauban first made use of them in 1673, at the siege of Maestricht.

Parallels of Latitude. See *Latitude.*

Paral'ysis, a bodily ailment, which in its effect consists in loss of power in moving or loss of feeling, or in both, and it is caused by disease of the brain, spinal cord, or nerves, or it may be due to lead-poisoning. When the paralysis is limited to one side of the body, and the voluntary power of moving the muscles is lost, this is due to disease of the brain and receives the specific name of *hemiplegia.* It is generally caused by the bursting of a blood-vessel in the brain; it may also be due to a blood-vessel being blocked by a clot of blood. The paralysis may be sudden and without unconsciousness, or it may be gradual and attended with sickness, faintness, and confusion of mind. In ordinary cases it will be found that one side of the body is powerless, the face twisted, the speech thick and indistinct. Recovery may be complete, or partial, or the attack may prove fatal. In any case the shock is apt to be repeated. When one side of the body and the opposite side of the face is affected, the disease, which has its seat in the region of the medulla oblongata, receives the name of *cross paralysis,* and is considered more dangerous than ordinary hemiplegia. When, again, the disease is situated in the spinal cord, the paralysis, which receives the name of *paraplegia,* may affect either the upper or lower part of the body, or motion may be lost on one side and sensation on the other. *Local paralysis* is the term used when disease or injury affects a specific nerve-trunk, and has no connection with disease of the brain or spinal cord. The effect of this local paralysis is to deprive the muscles of their nerve-supply, in which case they lose their power, becoming weak and faint.

Paramari'bo, the capital of Dutch Guiana or Surinam, about 18 miles above the mouth of the river Surinam, which is navigable for vessels of considerable size. It is the centre of the Dutch West Indian trade, and exports sugar, coffee, &c. Pop. 1891, 28,831.

Paramat'ta, or PARRAMATTA, a town in New South Wales, on a river of same name (really an extension of Port Jackson), in a beautiful and well-cultivated district, 14 miles west of Sydney. Woollen cloth is manufactured to some extent; and in the vicinity there are large salt-works and copper-smelting furnaces. Much fruit is grown in the district. The town is oldest in the colony except Sydney. Pop. 1891, 11,677.

Paramat'ta, a light twilled fabric with a weft of combed merino wool and a cotton warp. It was invented at Bradford, in Yorkshire, where it is still largely manufactured.

Paraná, a river in South America, the largest except the Amazon, and draining a larger basin than any other river in the New World except the Amazon and the Mississippi. It is formed by the junction of two streams, the Rio Grande and the Paranahyba, which meet in Brazil, and it discharges itself into the estuary of the La Plata, its course latterly being through the Argentine Republic. Its principal tributaries are the Paraguay and the Salado, both from the right. All the tributaries on its left are comparatively short. Its length, from its sources to its junction with the Paraguay, is probably 1500 miles, and thence to the sea 600 miles more. In breadth, current, and volume of water, the Paraná has ten times the magnitude of the Paraguay, which is itself superior to the greatest European rivers. It is an important waterway to the interior of the country, though with obstructions at certain points.

Paraná, a province of Southern Brazil, having on the north the province of São Paulo, east the Atlantic, south the province of Santa Catharina, and west Paraguay and the province of Matto Grosso; area, 85,429 square miles. Its chief town is Curitiba. Pop. 187,548.

Paranahyba (pä-rä-nä-ē'bä), one of the head streams of the river Paraná (which see).

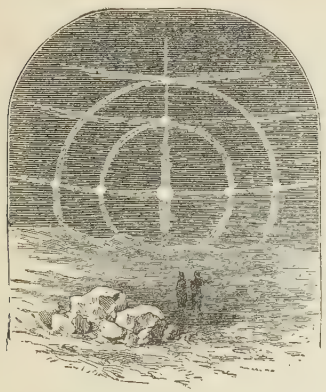
Parapet, in fortification, a work, usually of earth, intended to protect the troops within the ramparts, as well as the pieces of artillery used in the defence. In order to fire the defenders ascend a ledge called a banquette, about half-way up the parapet. In architecture the term parapet is applied to the structures placed at the edges of platforms, balconies, roofs of houses, sides of bridges, &c., to prevent people from falling over.

Paraphernalia, in law, a woman's apparel, jewels, and other things, which, in the lifetime of her husband, she wore as the ornaments of her person, and to which she has a distinct claim.

Paraple'gia. See *Paralysis.*

Par'asang, a Persian measure of distance used both in ancient and modern times. Its modern Persian name is *ferseng,* and its length is estimated at from 3½ to 4 English miles.

Paraselene (pa-ra-se-lē′nē), a luminous ring or circle sometimes seen round the moon, or there may be more than one ring



Paraselenæ.

as well as certain bright spots, bearing some resemblance to the moon. Paraselenæ or mock moons are analogous to parhelia or mock suns. See *Parhelion.*

Par′asites, the name applied to animals which attach themselves to the exterior, or inhabit various situations in the interior, of the bodies of other animals, including such forms as tape-worms, flukes, scolices or hydatids, fish-lice, bird-lice, common lice, &c. True parasites obtain their nourishment from the animals on which they live, but there is another class of parasites that only obtain a lodging or abode at the expense of the animals they accompany. See *Commensal.*

Parasitic Diseases, such as are produced by parasitic animals or plants. Among the animals producing such diseases are the guinea-worm, the louse, the trichina, tape-worms, &c. The vegetable parasites which produce disease in animals are either fungi or algæ. Ring-worm is an example of this class of diseases.

Parasitic Plants, such plants as grow on others, from which they receive their nourishment. In this class are many fungi, such as the *Urēdo caries,* which produces the formidable disease called bunt to which wheat is liable. Among larger parasites are the mistletoe; and the genus *Rafflesia,* belonging to Sumatra and Java. Parasites are distinguished from *epiphytes,* inasmuch as the latter, though they grow upon other plants, are not nourished by them. See *Epiphyte.*

Parasol, a small umbrella used as a sunshade. See *Umbrella.*

Paray le Monial, a town of France, dep. Saône-et-Loire, a common place of pilgrimage, as the place where the holy nun Marie Alacoque died in 1690. Pop. 3174.

Parbuckle, a method of raising or lowering any cylindrical body, such as a barrel, by an inclined plane and a rope, the rope being doubled, the double placed round a post at the top of the plane, and the ends passed under and round the object to be raised or lowered, when by pulling or slackening this can be accomplished.

Parcæ. See *Fates.*

Parchim (pär′hēm), a town of Germany, in the Grand-duchy of Mecklenburg-Schwerin, on the Elde, 21 miles south-east of Schwerin. It has manufactures of woollen cloth; flour, oil, paper, and saw mills, &c. It is the birthplace of Count von Moltke. Pop. 9726.

Parchment, the skins of sheep, she-goats, and several other animals, so dressed or prepared as to be rendered fit for writing on. This is done by stretching the skin on a frame, separating all the flesh and hair from the skin, reducing its thickness with a sharp instrument, and smoothing the surface with pumice-stone covered with pulverized chalk or slaked lime. After it is reduced to something less than half its original thickness, it is smoothed and slowly dried for use.

Pardee, ARIO, coal operator and philanthropist, born in Chatham, N. Y., in 1810. One of the pioneers of the Pennsylvania anthracite region, he amassed several millions as a coal operator. His donations to Lafayette College amounted to $500,000. He was active in various charitable movements. Died March 26, 1892.

Pardon, the remission of the penalty of a crime or offence. In England, in nearly all cases of crimes except where there is an impeachment, a pardon from the crown may be granted before a trial as well as after; and it stops further progress in the inquiry and prosecution at whatever time it is granted. In cases of impeachment no pardon can now be granted by the crown while the prosecution is pending; but after conviction of the offender it may be granted, as in other cases. Pardon was formerly granted by the crown under the great seal, but by 7 and 8 Geo. IV. cap. xxviii. s. 13

it was made sufficient for the sovereign to issue a warrant for the purpose under his sign-manual, and countersigned by a secretary of state. In the United States the pardoning power is lodged in the President and the Governors of the various States, and extends to all offences except those which are punished by impeachment after conviction. In some States concurrence of one of the legislative bodies or of a Pardoning Board is required.

Par'dubitz, Bohemia. Pop. 10,292.

Paré (pà-rā), AMBROISE, the father of French surgery, born early in the 16th century at Laval; studied at Paris. He acted for a time as an army-surgeon, and in 1552 he became surgeon to Henry II., under whose successors (Francis II., Charles IX., and Henry III.) he held the same post. He died in 1590.

Paregoric Elixir, known also as the camphorated tincture of opium, is a solution of powdered opium, camphor, benzoic acid, and oil of anise. When used carefully it is found to be an excellent anodyne and antispasmodic.

Pareira (pa-rī'ra), a Portuguese name given to the roots of certain plants employed in medical practice, as valuable tonics and diuretics. The sort admitted into the pharmacopœia is called *pareira brava*, and is produced by *Cissampelos Pareira*, nat. order Menispermaceæ.

Pareja (pà-rā'hà), JUAN DE, Spanish painter, 'the slave of Velasquez,' born of West Indian parents at Seville 1606, died 1670. In early life he was employed in menial work in the studio of Velasquez, and by closely watching his methods attained considerable skill secretly. At the intercession of Philip IV. he obtained his freedom, but continued in the family of Velasquez till his death. His success was chiefly in portraits, but he also painted several large pictures closely imitative of the style of his master.

Parent and Child, besides being a natural relationship, has its legal aspects, in which legitimacy and illegitimacy form a clear distinction. All children born in lawful wedlock, or within a satisfactory time afterwards, are considered legitimate; but the common law of England and Ireland does not compel parents to maintain their children. If the parents fail to do so, however, in the case of a child unable to earn its own living, the poor-law authority performs this duty, and by so doing can obtain the power, under an order from a justice of the peace, to compel the parents or other relatives to make a contribution for that purpose. Beyond this there is no legal provision for the maintenance of children by their parents; yet where the child contracts a debt, as for food, clothes, or education, the parents will usually be found liable. When the children are legitimate, it is provided by the common law that the father shall have them under his power until their majority; but it is now possible for the mother to apply to the court for rights of access and custody while the children are within sixteen years of age. The latter right is usually granted when the father is shown to be a person of immoral character. At death parents may, under a proper will, disinherit their children; but in the event of intestacy the children's share of the personal estate is divided equally among them, while real estate falls to the heir. In the case of an illegitimate child, the mother may summon the putative father to appear before a magistrate. When the affiliation charge is proved, the magistrate can order him to pay the lying-in expenses, and a weekly sum not exceeding five shillings until the child's sixteenth year. He is not, however, in any legal sense regarded as the father of the child, and, in consequence, neither can such a child inherit any of his property, nor is he entitled to the custody of the child. The common law of England, in all important features, has been followed by the American States. By the Elementary Education Act for England (1870), Scotland (1872), and various amendments, it has been provided that parents may be compelled to educate their children.

In Scotland the law upon this question differs in many points from the law in England and Ireland. Thus in Scotland parent and child are legally bound at common law to maintain each other, and this liability may descend after death to the representatives who are *lucrati* (or benefited) by the succession. Although a child is born illegitimate in Scotland, he becomes legitimate should his parents subsequently marry each other, and all his legal rights of inheritance are thus secured, just as if born in wedlock. Another distinction in Scotland is that the father cannot disinherit his child, children being entitled to a share of his personal estate known as *legitim*. In the U. States it is generally held that the right of protection and support due from a parent to a child is dependent on general principles

of the common law, as well as of morality; statutory provisions existing in most of the states. The reciprocal rights of parent and child cease when the child has attained his majority; but may be revived on either side: thus if an adult child become a pauper the parent becomes responsible for its support, and if the parent become a public burden the adult child is responsible. The parent can leave his property away from his children. The right to the custody of the child belongs to both parents; the child's preference being consulted if he is 14 years old or over, and if not the court may use its discretion. The father may collect his child's earnings, and sue for damages for loss of services from injuries inflicted by a third party. An action may be brought by the child when the parent is killed through another's negligence. The mother and putative father of an illegitimate child are liable for its support.

Pargetting, PARGE-WORK, a term used for plaster-work of various kinds, but commonly applied to a particular sort of ornamental plaster, with patterns and ornaments raised or indented upon it, much used in the interior and often in the exterior of houses of the Tudor period. Numbers of wooden houses so ornamented on the outside, and belonging to the time of Queen Elizabeth, are still to be met with.

Parhe'lion, a mock sun, having the appearance of the sun itself, and seen by the

Parhelia.

side of that luminary. Parhelia are sometimes double, sometimes triple, and sometimes more numerous. They appear at the same height above the horizon as the true sun, and they are always connected with one another by a white circle or halo. They are the result of certain modifications which light undergoes when it falls on the crystals of ice, rain-drops, or minute particles that constitute suitably situated clouds. Parhelia which appear on the same side of the circle with the true sun are often tinted with prismatic colours.

Pa'ria, GULF OF, an inlet of the Atlantic on the north-east coast of South America, between the island of Trinidad and mainland of Venezuela, inclosed on the north by the Peninsula of Paria. It possesses good anchorage, and receives some arms of the Orinoco.

Pa'riah, a name somewhat loosely applied to any of the lowest class of people in Hindustan, who have, properly speaking, no caste, hence, one despised and contemned by society; an outcast. Properly, however, Pariah (a Tamil name) is applied to the members of a somewhat widely spread race in Southern India, generally of the Hindu religion, and though regarded by the Hindus as of the lowest grade, yet superior to some ten other castes in their own country. They are frequently serfs to the agricultural class, or servants to Europeans.

Parian Chronicle. See *Arundelian Marbles*.

Parian Marble, a mellow-tinted marble, highly valued by the ancients, and chosen for their choicest works. The principal blocks were obtained from Mount Marpassus, in the island of Paros.

Pari'ma, or PARIME, SIERRA, a mountain range situated in the N.E. of Venezuela. In general it is composed of bare plateaus, and its highest peaks rise to a height of about 8000 ft. The Essequibo, Orinoco, and Rio Branco have their rise in this range.

Paring and Burning, a mode of reclaiming waste lands, sometimes also resorted to for fertilizing exhausted soils. It consists in paring off the surface and burning it for the sake of the ashes, which act as a manure.

Pari'ni, GIUSEPPE, an Italian poet, born in 1729, died in 1799. He studied at Milan, published some youthful poetry, and wrote a dramatic satire on the Milanese aristocracy entitled Il Giorno (The Day). He was latterly professor of rhetoric at Milan.

Pari passu, in law, a term signifying equally in proportion, without preference: used especially of the creditors of an insolvent estate who (with certain exceptions) are

entitled to payment of their debts in shares proportioned to their respective claims.

Paris, a genus of plants of the nat. order Trilliaceæ. *P. quadrifolia* (herb-paris, true-love, or one-berry) is not uncommon in Britain, being found in moist shady woods. It has a simple stem bearing a whorl of four ovate leaves near the summit, and a solitary greenish flower. The fruit is a purplish-black berry and the roots are purgative.

Paris (anciently, *Lutetia Parisiorum*), the capital of France and of the department of the Seine. The city lies in the Seine valley surrounded by heights, those on the north being Charonne La Villette, the Buttes-Chaumont, and Montmartre, those on the south St. Geneviève, Montrouge, and the Butte-aux-Cailles. Through the valleys between these heights, the river runs from east to west, inclosing two islands, upon which part of the city is built. It is navigable by small steamers. The quays or embankments, which extend along the Seine on both sides, being built of solid masonry, protect the city from inundation and form excellent promenades. The river, which within the city is fully 530 ft. in width, is crossed by numerous bridges, the more important being Pont Neuf, Pont des Arts, Pont du Carrousel, Pont Royal, Pont de l'Alma, &c. The city is surrounded by a line of fortifications which measures 22 miles; outside of this is the enceinte, while beyond that again are the detached forts. These now form two main lines of defence. The inner line consists of sixteen forts, the outer line of 18 forts besides redoubts; the area thus inclosed measuring 430 square miles, with an encircling line of 77 miles. The climate of Paris is temperate and agreeable. The city is divided into twenty arrondissements, at the head of each of which is a *maire*. Each arrondissement is divided into four quarters, each of which sends a member to the municipal council. The council discuss and vote the budget of the city. At the head is the prefect of the Seine and the prefect of police. The water supply of the city is derived from the Seine and the Marne, from the Ourcq Canal, from artesian wells, and from springs.

Streets, Boulevards, &c.—The houses of Paris are almost all built of white calcareous stone, and their general height is from five to six stories, arranged in separate tenements. Many of the modern street buildings have mansard roofs, and are highly enriched in the Renaissance manner. In the older parts of the city the streets are narrow and irregular, but in the newer districts the avenues are straight, wide, and well-paved. What are known as 'the boulevards' include the interior, exterior, and military. That which is specifically called *The Boulevard* extends, in an irregular arc on the north side of the Seine, from the Place de la Bastille in the east to the Place de la Madeleine in the west. It includes the Boulevards du Temple, St. Martin, St. Denis, des Italiens, Capuchins, Madeleine, &c., and its length of nearly 3 miles forms the most stirring part of the city. Here may be noted also the magnificent triumphal arches of Porte St. Denis and Porte St. Martin, the former of which is 72 feet in height. On the south side of the Seine the boulevards are neither so numerous nor so extensive, the best-known being the Boulevard St. Germain, which extends from Pont Sully to the Pont de la Concorde. The exterior boulevards are so named because they are outside the old *mur d'octroi;* and the military boulevards, still further out, extend round the fortifications. After the boulevards mentioned the best streets are the Rue de Rivoli, Rue Castiglione, Rue de la Paix, Rue de la Chaussée d'Antin, the Rue des Pyramides, and twelve fine avenues radiating from the Place de l'Etoile. There are six passenger stations for the railways to the various parts of the country, and a railway around the city (the *ceinture*), by means of which interchange of traffic between the different lines is effected. There are also tramway lines to Versailles, St. Cloud, and other places in the suburbs.

Squares, Parks, &c.—The most notable public squares or *places* are the Place de la Concorde, one of the largest and most elegant squares in Europe, surrounded by fine buildings and adorned by an Egyptian obelisk, fountains, and statues; Place de l'Etoile, in which is situated the Arc de Triomphe, a splendid structure 152 feet in height; the Place Vendôme, with column to Napoleon I.; Place des Victoires, with equestrian statue of Louis XIV.; Place de la Bastille, with the Column of July; Place de la République, with colossal statue of the Republic; &c. Within the city are situated the gardens of the Tuileries, which are adorned with numerous statues and fountains; the gardens of the Luxembourg, in which are fine conservatories of rare

PARIS.—The Place de la Concorde and Montmartre, from the Chamber of Deputies.

plants; the Jardin des Plantes, in which are the zoological gardens, hothouses, museums, laboratories, &c., which have made this scientific institution famous; the Buttes-Chaumont Gardens, in which an extensive old quarry has been turned to good account in enhancing the beauty of the situation; the Parc Monceaux; and the Champs Élysées, the latter being a favourite holiday resort of all classes. But the most extensive parks are outside the city. Of these the Bois de Boulogne, on the west, covers an area of 2150 acres, gives an extensive view towards St. Cloud and Mont Valérien, comprises the race-courses of Longchamps and Auteuil, and in it are situated lakes, an aquarium, conservatories, &c. The Bois de Vincennes, on the east, even larger, is similarly adorned with artificial lakes and streams, and its high plateau offers a fine view over the surrounding country. The most celebrated and extensive cemetery in Paris is Père la Chaise (106½ acres), finely situated and having many important monuments. The Catacombs are ancient quarries which extend under a portion of the southern part of the city, and in them are deposited the bones removed from old cemeteries now built over.

Churches.—Of the churches of Paris the most celebrated is the Cathedral of Notre Dame, situated on one of the islands of the Seine, called the Île de la Cité. It is a vast cruciform structure, with a lofty west front flanked by two square towers, the walls sustained by many flying-buttresses, and the eastern end octagonal. The whole length of the church is 426 feet, its breadth 164 feet. The foundation of Notre Dame belongs to the 6th century; the present edifice dates from 1163; but was restored in 1845. The interior decorations are all modern. The church of La Madeleine, a modern structure in the style of a great Roman temple, entirely surrounded by massive Corinthian columns, stands on an elevated basement fronting the north end of the Rue Royale; the church of St. Geneviève, built about the close of the last century, was after its completion set apart, under the title of the Panthéon, as the burying-place of illustrious Frenchmen; St. Eustache (1532–1637), a strange mixture of degenerate Gothic and Renaissance architecture; St. Germain l'Auxerrois, dating from the 15th and 16th centuries; St. Gervais; St. Roch; St. Sulpice; Notre Dame de Lorette; St. Vincent de Paul; &c. On the very summit of Montmartre is the Church of the Sacred Heart, a vast structure in mediæval style, estimated to cost £960,000. The Protestant churches are the Oratoire and Visitation, and chapels belonging to English, Scotch, and American denominations. There are also a Greek chapel and several synagogues.

Palaces and Public Buildings.—Notable among the public buildings of Paris are its palaces. The Louvre, a great series of buildings within which are two large courts, is now devoted to a museum which comprises splendid collections of sculpture, paintings, engravings, bronzes, pottery, Egyptian and Assyrian antiquities, &c. (see *Louvre*); the palace of the Tuileries, the main front of which was destroyed in 1871 by the Communists, has since been restored, with the exception of its principal façade, the ruins of which have been removed and its site converted into a garden; the Palais du Luxembourg, on the south side of the river, has very extensive gardens attached to it, and contains the Musée du Luxembourg, appropriated to the works of modern French artists; the Palais Royal (which see) is a famed resort; the Palais de l'Élysée, situated in the Rue St. Honoré, with a large garden, is now the residence of the president of the republic; the Palais du Corps Législatif, or Chambre des Députés, is the building in which the chamber of deputies meets; the Palais de l'Industrie, built for the first international exhibition in 1855, is used for the annual *salon* of modern paintings, &c. The Hôtel de Ville is situated in the Place de l'Hôtel de Ville, formerly Place de Grève, on the right bank of the river. It was destroyed by the Communists in 1871, but has now been re-erected on the same site with even greater magnificence. It is a very rich example of Renaissance architecture. The Hôtel des Invalides, built in 1670, with a lofty dome, is now used as a retreat for disabled soldiers and is capable of accommodating 5000. It contains the burial-place of the first Napoleon. The Palais de Justice is an irregular mass of buildings occupying the greater part of the western extremity of the Île de la Cité. Opposite the Palais de Justice is the Tribunal de Commerce, a quadrangular building inclosing a large court roofed with glass. The Mint (Hôtel des Monnaies) fronts the Quai Conti, on the south side of the Seine, and contains an immense collection of coins and medals. The other principal government buildings are the Treasury

(Hôtel des Finances), in the Rue de Rivoli; the Record Office (Hôtel des Archives Nationales). The Exchange (La Bourse) was completed in 1826; it is in the form of a parallelogram, 212 feet by 126 feet, surrounded by a range of sixty-six columns. A distinctive feature are the extensive markets, among the most important of which are the Halles Centrales, where fish, poultry, butcher-meat, and garden produce are sold. A notable and unique structure is the Eiffel Tower, built in connection with the Paris Exhibition of 1889, and which is to have a kind of permanent existence. It is a structure of iron lattice-work 984 feet high, and having three stages or platforms. It is as yet the highest building in the world.

Education, Libraries, &c.—The chief institution of higher education is the academy of the Sorbonne, where are the university 'faculties' (see *France*, section *Education*) of literature and science, while those of law and of medicine are in separate buildings. There are, besides, numerous courses of lectures in science, philology, and philosophy delivered in the Collége de France, and courses of chemistry, natural history, &c., in the museum of the Jardin des Plantes. Among other Parisian schools are the secondary schools or lycées, the most important of which are Descartes (formerly Louis le Grand), St. Louis, Corneille (formerly Collége Henri IV.), Charlemagne, Fontanes (formerly Condorcet), De Vanves; the École Polytechnique for military and civil engineers, &c.; École des Beaux Arts; School of Oriental Languages; Conservatoire des Arts et Métiers, and the Conservatoire de Musique. Of the libraries the most important is the Bibliothèque Nationale, the largest in the world. The number of printed volumes which it contains is estimated at 2,500,000, besides 3,000,000 pamphlets, manuscript volumes, historical documents, &c. The other libraries are those of the Arsenal, St. Geneviève, Mazarin, De la Ville, De l'Institut, and De l'Université (the Sorbonne). There are also libraries subsidized by the municipality in all the arrondissements. Among museums, besides the Louvre and the Luxembourg, there may be noted the Musée d'Artillerie, in the Hôtel des Invalides, containing suits of ancient armour, arms, &c.; the Conservatoire des Arts et Métiers; the Trocadéro Palace, containing curiosities brought home by French travellers, casts from choice specimens of architecture, &c.; and the Cluny Museum, containing an extensive collection of the products of the art and artistic handicrafts of the middle ages. The chief of the learned societies is the Institute of France (which see).

Hospitals, &c.—There are many hospitals in Paris devoted to the gratuitous treatment of the indigent sick and injured; and also numerous establishments of a benevolent nature, such as the Hôtel des Invalides, or asylum for old soldiers, the lunatic asylum (Maison des Aliénés, Charenton), blind asylums; the deaf and dumb institute (Institution des Sourds-Muets); two hospitals at Vincennes for wounded and convalescent artisans; the *crèches*, in which infants are received for the day at a small charge; and the *ouvroirs*, in which aged people are supplied with work.

Theatres.—The theatres of Paris are more numerous than those of any other city in the world. The most important are the Opera House, a gorgeous edifice of great size; the Opéra Comique, the Théâtre Français, the Odéon; the Théâtre de la Gaîté, for vaudevilles and melodramas; Théâtre des Folies Dramatiques, Théâtre du Chatelet, Théâtre du Vaudeville, Théâtre des Variétés, Théâtre de la Porte St. Martin, and the Théâtre de l'Ambigu Comique.

Industries and Trade.—The most important manufactures are articles of jewelry and the precious metals, trinkets of various kinds, fine hardware, paper-hangings, saddlery and other articles in leather, cabinet-work, carriages, various articles of dress, silk and woollen tissues, particularly shawls and carpets, Gobelin tapestry, lace, embroidery, artificial flowers, combs, machines, scientific instruments, types, books, engravings, refined sugar, tobacco (a government monopoly), chemical products, &c. That which is distinctively Parisian is the making of all kinds of small ornamental articles, which are called *articles de Paris*. A large trade is carried on by the Seine both above and below Paris as well as by canals.

Population.—According to approximate estimates the population of Paris was, in 1474, 150,000; under Henry II. (1547–59), 210,000; in 1590, 200,000; under Louis XIV. (1643–1715), 492,600; in 1856 (before the annexation of the parts beyond the old *mur d'octroi*), 1,174,346; 1861 (after the annexation), 1,667,841; 1881, 2,269,023; 1886, 2,256,050; 1891, 2,447,957.

History.—The first appearance of Paris in history is on the occasion of Cæsar's con-

quest of Gaul, when the small tribe of the Parisii were found inhabiting the banks of the Seine, and occupying the island now called Île de la Cité. It was a fortified town in 360 A.D., when the soldiers of Julian here summoned him to fill the imperial throne. In the beginning of the 5th century it suffered much from the northern hordes, and ultimately fell into the hands of the Franks, headed by Clovis, who made it his capital in 508. In 987 a new dynasty was established in the person of Hugo Capet, from whose reign downwards Paris has continued to be the residence of the kings of France. In 1437 and 1438, under Charles VII., Paris was ravaged by pestilence and famine, and such was the desolation that wolves appeared in herds and prowled about the streets. Under Louis XI. a course of prosperity again commenced. In the reign of Louis XIV. the Paris walls were levelled to the ground after having stood for about 300 years, and what are now the principal boulevards were formed on their site (1670). Only the Bastille was left (till 1789), and in place of the four principal gates of the old walls, four triumphal arches were erected, two of which, the Porte St. Denis and Porte St. Martin, still stand. Many of the finest edifices of Paris were destroyed during the revolution, but the work of embellishment was resumed by the directory, and continued by all subsequent governments. The reign of Napoleon III. is specially noteworthy in this respect; during it Paris was opened up by spacious streets and beautified to an extent surpassing all that had hitherto been effected by any of his predecessors. The most recent events in the history of Paris are the siege of the city by the Germans in the war of 1870–71, and the subsequent siege carried on by the French national government in order to wrest the city from the hands of the Commune. Paris has been the scene of international exhibitions in 1855, 1867, and 1878, but the most important was that of 1889 in commemoration of the centenary of the French revolution. In all respects it proved a complete success, the number of visitors being over 25,000,000.

Paris, in Greek mythology, also called Alexander, the second son of Priam, king of Troy, by Hecuba. His mother dreamed before his birth that she had brought forth a firebrand, which was interpreted to mean that he would cause the destruction of Troy. To prevent this the child was exposed on Mount Ida, where he was discovered by a shepherd, who brought him up as his own son. Here his grace and courage commended him to the favour of Œnone, a nymph of Ida, whom he married. At the marriage of Peleus and Thetis a dispute arose whether Hera, Athena, or Aphroditē was the most beautiful, and as such entitled to the golden apple. Paris was chosen judge, and decided in favour of Aphroditē, who had promised him the fairest woman in the world for his wife. Subsequently he visited Sparta, the residence of Menelaus, who had married Helena (or Helen), the fairest woman of the age, whom he persuaded to elope with him. This led to the siege of Troy, at the capture of which he was killed by an arrow.

Paris, Louis Albert Philippe d'Orleans, Comte de, son of the Duc d'Orleans, and grandson of Louis-Philippe, born 1838. After the revolution of 1848 he resided chiefly in Claremont, England, where he was educated by his mother. During the American civil war of 1861 he, along with his brother the Duc de Chartres, volunteered into the northern army, and served for some time on the staff of General M'Clellan. On his return to Europe the following year he married his cousin the Princess Marie-Isabelle, eldest daughter of the Duc de Montpensier. After the Franco-German war he was admitted a member of the first national assembly. The Comte de Paris was recognized as head of the royal house of France. Under the expulsion bill (1886) he, along with the other princes, was forbidden to enter France. He published a History of the Civil War in America, and a work on English Trade-unions. He died Sept. 8, 1894, in England.

Paris, Matthew, an English historian, born about 1195, died 1259. He entered the Benedictine monastery of St. Albans, and in 1235 succeeded Roger of Wendover as chronicler to the monastery. He was very intimate with Henry III., and had a large number of influential friends besides. In 1248 he went on an ecclesiastical mission to Norway. He is characterized as at once a mathematician, poet, orator, theologian, painter, and architect. His principal work is his Historia Major (or Chronica Majora), written in Latin, and comprising a sketch of the history of the world down to his own times, the latter portion (1235–59) being, however, the only part exclusively his; the Historia Anglorum, called also Historia

Minor, a sort of abridgment of the former; and also Lives of the Abbots of St. Albans, Kings of Mercia, &c.

Paris, TREATIES OF. Of the numerous treaties bearing this designation a few only of the most important can be mentioned here. On Feb. 10, 1763, a treaty of peace was signed between France, Spain, Portugal, and England, in which Canada was ceded to Great Britain. On Feb. 6, 1778, was signed that between France and the United States, in which the independence of the latter country was recognized. A treaty was signed between Napoleon I. and the allies, ratified April 11, 1814, by which Napoleon was deposed and banished to Elba. The treaty for the conclusion of peace between Russia on the one hand, and France, Sardinia, Austria, Turkey, and Great Britain on the other, at the end of the Crimean war, was ratified March 30, 1856. Lastly, the treaty of peace with Germany, at the end of the Franco-German war, was concluded May 10, 1871, and modified by the convention of October 12, 1871, by which France lost a great part of the Rhine provinces.

Paris, UNIVERSITY OF, came into existence in the beginning of the 13th century, and was long the most famous centre of learning in Europe. It was suppressed by a decree of the Convention in 1793.

Paris, Lamar co., Texas, on the Texas and Pacific R. R., is the centre of trade for a rich agricultural and cotton-producing region, with several factories. Pop. 8254.

Paris Basin, in geology, the great area of tertiary strata on which Paris is situated. Besides a rich fossil fauna of marine and fresh-water mollusca, the remains of mammals are abundant and interesting from their affinity to living forms.

Paris Blue, a bright blue obtained by exposing rosaniline, aniline and some benzoic acid to a temperature of 180° C.

Paris Green, a preparation of copper and arsenic employed on artificial flowers, in wall-papers, and as an insecticide on plants. It is a virulent poison.

Parish, a district marked out as that belonging to one church, and whose spiritual wants are to be under the particular charge of its own minister; or, to give the sense which the word often has in acts of parliament, a district having its own offices for the legal care of the poor, &c. Parishes have existed in England for more than a thousand years. They were originally ecclesiastical divisions, but now, in England especially, a parish is an important subdivision of the country for purposes of local self-government, most of the local rates and taxes being confined within that area, and to a certain extent self-imposed. In Scotland the division into parishes was complete about the beginning of the 13th century, and this division is also recognized for certain civil purposes as well as for purposes purely ecclesiastical. In the United States a parish is a body of people united in one church organization. In Louisiana the counties are called parishes.

Parish Clerk is an officer in the Church of England, whose principal duties are to read the responses to the minister. The appointment is generally made by the incumbent, and the emoluments consist of certain fees on marriages, burials, &c., besides fixed wages.

Parish School, formerly the public school of a parish in Scotland. The foundation of parish schools in Scotland is due to John Knox. The establishment of such schools was authorized by act of parliament in 1615; and by act 1696, cap. xxvi., it was required that where no parochial school had been before established the heritors were to provide a school-house and pay a certain sum for the support of the schoolmaster. If the heritors failed in this duty the presbytery might apply to the commissioners of supply to have it effected. The sufficiency and qualification of the parochial schoolmasters, as well as their conduct after their admission, were to be judged by the presbytery. By the statute 43 Geo. III. cap. liv., by which the parish schools were to be regulated after 1803, the choice of the schoolmaster was vested in the minister and heritors. An act passed in 1861 made important alterations and modifications, and since the Education Act of 1872 parish schools in their distinctive character now exist no longer, being transferred to the control of the school-boards.

Park, in a legal sense, a large piece of ground inclosed and privileged for wild beasts of chase, by the monarch's grant, or by prescription. The only distinction between a *chace* and a *park* was, that the latter was inclosed, whereas a chace was always open. The term now commonly means a considerable piece of ornamental ground connected with a gentleman's residence; or an inclosed piece of public ground devoted to recreation, and generally in or near a large town.

Park, MUNGO, African traveller, born near Selkirk in Scotland 1771, died 1806. He was educated at Edinburgh for the medical profession; received an appointment as assistant-surgeon on board an East Indiaman and made a voyage to India. Returning to England in 1793 he was engaged by the African Society to trace the course of the Niger. He reached the Gambia at the end of 1795, and advancing north-eastward arrived at the Niger near Segu. After exploring part of the course of the river he returned home, and published his Travels in the Interior of Africa in 1799. He settled at Peebles as a country doctor, but in 1805 accepted command of a government expedition to the Niger. Having advanced from Pisania on the Gambia to Sansanding on the Niger, he built a boat at the latter place, with the intention of following the Niger to the sea. It was afterwards ascertained that the expedition advanced down the river as far as Boussa, where it was attacked by the natives. It is supposed that Mungo Park was drowned in his efforts to escape. The Journal of his second expedition as far as the Niger was published in 1815.

Parke, THOMAS HEAZLE, surgeon, was born in Roscommon, Ireland, Nov. 27, 1857, and educated at Dublin. He participated as surgeon in the campaign in Egypt in 1882, and in that for the relief of Gen. Gordon in 1884–5; also with Stanley's Emin Pasha relief expedition, in 1887–90. He received medals from the British Medical Association, the Royal Geographical Societies of London and Antwerp, the Queen's medal, and the Khedive's Star. He died Sept. 11, 1893.

Parker, SIR HYDE, British admiral, born about the year 1711, fought against the French, Spaniards, and Dutch. In 1783 he perished on his way to the East Indies.

Parker, JOHN HENRY, English archæologist, born 1806, died 1884. He was a well-known publisher in Oxford, and in 1870 became keeper of the Ashmolean Museum. He devoted much time and labour to excavations in Rome.

Parker, MATTHEW, Archbishop of Canterbury, born at Norwich 1504, died 1575. He was educated at Cambridge, and after having been licensed to preach was appointed dean of Stoke College in Suffolk. He was also made a king's chaplain and a canon of Ely. In 1544 he was appointed Master of Corpus Christi College, Cambridge, and elected vice-chancellor of that university the following year. When Queen Mary succeeded to the throne Parker was deprived of his offices, and remained in concealment until the accession of Elizabeth in 1558. By royal command he was summoned to Lambeth, and appointed Archbishop of Canterbury. It was while he held this office that he had what is known as the Bishops' Bible translated from the text of Cranmer, and published at his own expense. He was the founder of the Antiquarian Society, a collector of MSS., which he presented to his college, and editor of the Chronicles of Walsingham, Matthew Paris, and Roger of Wendover.

Parker, THEODORE, American divine, son of a Massachusetts farmer, born at Lexington 1810, died at Florence 1860. He studied at Harvard University, and in 1837 was settled as a Unitarian preacher at West Roxbury. Although his doctrine was accounted heterodox, yet such was his eloquence and ability that he soon became famous as a preacher and lecturer over New England. In 1843 he visited England, France, Italy, and Germany, and settled as a preacher in Boston on his return. He was a prominent advocate of the abolition of slavery. The principal of his published works are: Occasional Sermons and Speeches; and Sermons on Theism, Atheism, and the Popular Theology.

Parker, SIR WILLIAM, British admiral, born 1781, died 1866, entered the naval service, greatly distinguished himself by the capture of the *Belle-Poule*, a French frigate, and in 1809 made himself master of the citadel of Ferrol. In 1841 he took command of the fleet operating against China; forced the entrance of the Yang-tse-kiang, and appeared before Nanking, where terms of peace were agreed upon. In 1863 he was made admiral of the fleet.

Parkersburg, a city of the U. States, in W. Virginia, on the Ohio. Pop. 8408.

Parkman, FRANCIS, American historian, was born in Boston in 1823. His 'History and Conspiracy of Pontiac,' published in 1851, won for him recognition as a master in the field of historical composition. 'France and England in North America,' a series of historical narratives, treating of a period extending from 1694 to 1750, completed in 1892 with 'A Half Century of Conflict,' shows the rivalry between the English and French in the settlement of North America. His works were republished in England. He died Nov. 8, 1893.

Parkesine (from a Mr. Parkes), a name for celluloid or a variety of it.

Parliament (French, *parlement*, from *parler*, to speak), the supreme legislative assembly and court of law in Britain. In the article *Britain* the power and organization of parliament is dealt with, while here its procedure and regulations are noted. When a new parliament is summoned, and the two houses have met on the appointed day in their respective chambers, the lord-chancellor requires the presence of the Commons in the Upper House to hear her Majesty's commission read. When this is done the Commons withdraw to the Lower House and choose a speaker, previous to the election of whom the clerk of the House acts as speaker. After his election the administration of the requisite oath to the members is then proceeded with in both Houses. When most of the members have been sworn, the Commons are summoned to the upper house, and the purposes for which parliament has been assembled are then declared, either by the queen in person or by her representative. After the royal speech, containing this declaration, has been read in presence of the members of both Houses, a reply to the address is moved in each house separately.

A house for the transaction of business must consist of at least forty members, otherwise the speaker will not take the chair. The speaker of the House of Commons cannot take part in a debate in the House, and can only speak on questions of order or practice. He can, however, vote in cases where the votes are equally divided, or in committees of the whole house. The lord-chancellor is *ex officio* the speaker of the House of Lords, and he may both speak and vote in the House. When a division takes place upon a motion (that is, when a vote is taken on the motion) the practice is that those assenting to and those dissenting from the motion before the House each retire into a separate lobby provided for that purpose, and are counted as they re-enter the house, by two tellers on either side, who are appointed by the speaker. The mover of a motion puts it in writing, and delivers it to the speaker, who, when it has been seconded, puts it to the House, after which it cannot be withdrawn without the consent of the House. There are various ways in which a motion may be superseded, such as by the adjournment of the House, by the motion that the orders of the day be now read, and by the moving of the 'previous question' (which see). The House is adjourned when it is found that there are fewer than forty members present. Order is generally enforced by the chair, and in extreme cases of obstruction or the like, the offender is 'named' and suspended, or otherwise dealt with at the discretion of the house. Irrelevancy or tedious repetition may also be dealt with by the chair, and to prevent debates being endlessly protracted, a measure called the 'closure,' has been recently adopted. See *Closure*.

The method of making laws is much the same in both Houses. In order to bring a private bill into the House of Commons it is first necessary to prefer a petition setting forth the aims of the measure, and otherwise comply with the standing orders of the house. When this is done the House, on the motion of a member, directs the bill to be introduced. The second reading of the bill is then fixed, and after being read it is referred to a select committee, upon which devolves all the actual work, in the shape of amendment, acceptance, or rejection. The committee on completion of its labours reports to the House, and the bill may then be read a third time and passed. Private bills include all those of a purely local character, such as the measures promoted by municipal corporations, private individuals, railway, gas, and water companies, &c. In public matters a bill is brought in upon motion made to the House without any petition. The bill is read a first time, and after a convenient interval a second time; and after each reading the speaker puts the question whether it shall proceed any further. If the opposition succeeds the bill must be dropped for that session. After the second reading it is referred to a committee, which is either selected by the House or the House resolves itself into a committee of the whole House. A committee of the whole House is composed of every member, and is presided over by a chairman other than the speaker—the speaker having vacated the chair, and the mace that lies before him having been removed. In these committees the bill is debated clause by clause, amendments made, the blanks filled up, and sometimes the bill entirely new-modelled. After it has gone through the committee the chairman reports to the House such amendments as have been made, and then the House reconsiders the whole bill again. When the House has agreed or disagreed to the amendments of

the committee, the bill is then ordered to be reprinted. It is then read a third time, and amendments are at this stage of its progress sometimes made. The speaker then puts the question whether the bill shall pass. If this be agreed to the title is settled, and the bill carried to the bar of the Upper House, where it is received by the chancellor. It there passes through the same forms as in the other House, and if rejected no more notice is taken of it. But if it be agreed to the Lords send a message by one of the clerks, or on rare occasions by two masters in chancery to that effect, and the bill remains with the Lords. If any amendments are made, such amendments are sent down with the bill to receive the concurrence of the Commons. If the Commons disagree to the amendments, and both Houses in conference fail to agree, then the bill is dropped. If, however, the Commons agree to the amendments the bill is sent back to the Lords by one of the members, with a message to acquaint them therewith. The same forms are observed, *mutatis mutandis*, when the bill begins in the House of Lords.

The royal assent to bills may be given by the queen in person; in which case she attends the House of Lords in state; or the royal assent may also be given under letters patent and notified in her absence, to both Houses assembled together in the Upper House, by commissioners, consisting of certain peers named in the letters. When the bill has received the royal assent in either of these ways it is then, and not before, a statute or act of parliament. All proceedings relating to the public income or expenditure originate in the Commons; a committee of the whole House called the committee of supply, discussing and passing the various estimates during the session. These are all consolidated in an appropriation bill at the end of the session sent to the House of Lords for approval, receive the royal assent and become law. In what is called a committee of ways and means the House of Commons considers the means by which the expenditure resolved upon in supply is to be met.

The privileges of parliament are large and indefinite, and are partly limited by statute and partly by known precedent; but they are to a great extent customary, and the Houses themselves are the only tribunals which can determine an alleged violation of them. Certain privileges, however, are clearly defined. The first is freedom of speech in debates. But if any member in the course of a debate use offensive words, he may be called to the bar to receive a reprimand from the speaker, committed to prison, or otherwise dealt with according to the pleasure of the House. The next privilege is that of freedom from arrest in civil suits. This privilege is enjoyed always by peers, and in the case of the Commons during the sitting of parliament, and for forty days after each prorogation, and as many days before the date to which it has been prorogued. Other privileges are those of free access to the sovereign and favourable construction at his or her hands of all the proceedings of parliament. Parliament is prorogued (that is, its session determined) and dissolved by authority of the sovereign.

Parliamentary Papers. See *Blue-books.*

Parma, a city of North Italy, capital of the province of Parma, on the small river Parma, 72 miles south-east of Milan. It is surrounded by a line of ramparts and bastions, and though an old town has quite a modern aspect. The principal squares are four, and one of them, the Piazza Grande, is large and handsome. Among the more important buildings are the cathedral, begun in 1058, a cruciform building with a dome, an excellent example of the Lombard-Romanesque style, the interior of the dome being painted in fresco by Correggio; the baptistery, a structure of marble; the church of La Steccata; the church of San Giovanni, which, with other churches and buildings, contains paintings by Correggio and Mazzuoli, who were born here; the ducal palace, now the prefecture; the Palazzo dello Pilotta, comprising the museum of antiquities, picture-gallery, and library (more than 200,000 vols. and 5000 MSS.); and the university (about 200 students). Parma was originally an Etruscan town, and became a Roman colony in 183 B.C. The manufactures are of silk, cottons, woollens, felt-hats, &c. Pop. 44,494. The province lies on the right bank of the Po; area, 1253 square miles; pop. 277,842. It is watered chiefly by the Taro, the Parma, and the Enza, all of which fall into the Po.

Parma, Duchy of, formerly an independent state of Upper Italy, but since 1860 incorporated in the Kingdom of Italy, and divided into the provinces of Parma and Piacenza. It comprehended the three duchies of Parma proper, Placentia or Piacenza, and Guastalla, and had an area of about 2266 square miles. Parma anciently

formed part of Gallia Cispadana and Liguria. Charlemagne made a present of it to the pope; but it subsequently became an independent republic, and in the 16th century was erected into a duchy which was long ruled by the Farnese dukes. The victories of the French in Italy in the beginning of this century enabled Napoleon to seize the duchy and attach it to his Kingdom of Italy. After Napoleon's downfall it fell to his widow, the Archduchess Maria Louisa, for life, and thereafter to the Duke of Lucca.

Parmegianino (pär-mej-ä-nē′nō). Same as *Mazzola*.

Parmen′ides (-dēz), Greek philosopher, head of the Eleatic school, native of Elea in Italy, and flourished about the middle of the 5th century B.C. In 450 he went to Athens, accompanied by his pupil Zeno, and there became acquainted, according to Plato, with Socrates. Like Xenophanes he developed his philosophy in a didactic poem On Nature, of which about 160 lines are still extant. One part of this poem dealt with what *is* or 'Truth,' and the second part with what only *appears* or 'Opinion.'

Parme′san Cheese, a cheese made of skimmed milk in the neighbourhood of Parma by a peculiar process, flavoured with saffron, and celebrated for its keeping qualities. Indeed, it becomes so hard as to require to be grated when used.

Parmigiano (pär-mē-jä′nō). See *Mazzola*.

Parnahyba (pär-nä-ē′bä), a river of Brazil, which rises in the north-east of the province of Goyaz, flows north-east, forms the boundary between the provinces of Piauhi and Maranhão, and falls into the Atlantic below Parnahyba; total course about 800 miles. The port of Parnahyba admits only small vessels. Pop. 6000.

Parnas′sus, or LIAKU′RA, a mountain of Greece, situated in Phocis, 65 miles north-west of Athens. It has two prominent peaks, one of which was dedicated to the worship of Bacchus, and the other to Apollo and the Muses, while on its southern slope was situated Delphi and the Castalian fount. Its height is 8068 feet, and a magnificent view is obtained from its top.

Parnell, CHARLES STEWART, born at his father's estate of Avondale, co. Wicklow, Ireland, in 1846, is connected on his father's side with a family that originally belonged to Congleton, Cheshire, and whose members included Parnell the poet, and Sir John Parnell, chancellor of the exchequer in Grattan's parliament; while his mother is the daughter of Admiral Stewart of the U.S. navy. He was educated at Magdalen College, Cambridge; became member of parliament for Meath in 1875; organized the 'active' Home Rule Party, and developed its obstruction tactics; and in 1879 formally adopted the policy of the newly-formed Land League, was an active member of it, and was chosen president of the organization. In 1880 he was returned for the City of Cork, and was chosen as leader of the Irish party. In the session of 1881 he opposed the Crimes Act and the Land Act; was arrested (13th Oct.) under the terms of the former, along with other members of his party; and was lodged in Kilmainham Jail, from whence he was not released until the following May. In 1883 he was the recipient of a large money testimonial (chiefly collected in America), and in this year was active in organizing the newly-formed National League. At the general election of 1885 he was re-elected for Cork, and next year he and his followers supported the Home Rule proposals introduced by Mr. Gladstone, while he also brought in a bill for the relief of Irish tenants that was rejected. In 1887 he and other members of his party were accused by the Times newspaper of complicity with the crimes and outrages committed by the extreme section of the Irish Nationalist party. To investigate this charge a commission of three judges was appointed by the government in 1888, with the result that, after a great deal of evidence was led on both sides, a report was laid before parliament in Feb., 1890, Mr. Parnell being acquitted of all the graver charges. Died Oct. 6, 1891.

Parnell, THOMAS, poet, born in Dublin 1679, died 1717. He was educated at Trinity College, and taking orders in 1705 was presented to the archdeaconry of Clogher, but he resided chiefly in London. He was at first associated with Addison, Congreve, Steele, and other Whigs; but towards the latter part of Queen Anne's reign he joined the Tory wits, of whom the most notable were Swift, Pope, Gay, and Arbuthnot. He afforded Pope some assistance in his translation of Homer, and wrote the Life prefixed to it. By Swift's recommendation he obtained a prebend in the Dublin Cathedral and the valuable living of Finglass. After his death a collection of his poems was published by Pope in 1721.

Parochial Board, in Scotland, a body of men in a parish elected by the payers of

poor-rates to manage the relief of the poor, a duty which, in England, is performed by overseers, and in some cases by the guardians of the poor.

Par'ody, a kind of literary composition, usually in verse, in which the form and expression of grave or serious writings are closely imitated, but adapted to a ridiculous subject or a humorous method of treatment.

Parole', a promise given by a prisoner of war that he will not try to escape if allowed to go about at liberty; or to return, if released, to custody at a certain time if not discharged; or not to bear arms against his captors for a certain period; and the like.

Pa'ros, an island in the Grecian Archipelago, one of the Cyclades, 4 miles west of Naxos; length 13 miles; breadth 10 miles. It is generally mountainous; but the soil, though often rocky, is fertile, and in some places well cultivated. Its marble has been famous from ancient times, and is the material of which some of the most celebrated pieces of statuary are composed. Paros was the birthplace of the poet Archilochus and the painter Polygnotus. Parikia, a seaport on the north-west coast, is the chief village; pop. 2200. Pop. of island 6885.

Paro'tid Gland, in anat. one of the salivary glands, there being two parotids, one on either side of the face, immediately in front of the external ear, and communicating with the mouth by a duct.

Par'quetry, a species of inlaid woodwork in geometric or other patterns, and generally of different colours, principally used for floors.

Parr, a small fish common in the rivers of England and Scotland, at one time believed to be a distinct species of the genus *Salmo*, but now almost universally regarded as the young of the salmon. The term is also applied to the young of any of the Salmonidæ. Called also *Brandling*.

Parr, CATHARINE. See *Catharine Parr*.

Parr, SAMUEL, English scholar, born 1747, died 1825. He was educated at Harrow and Cambridge; taught successively in the grammar-schools of Stanhope, Colchester, and Norwich; and in 1783 became perpetual curate of Hatton in Warwickshire. Here he engaged in literature, and became noted among his contemporaries as a classic purist and bitter polemic.

Parr, THOMAS, better known as *Old Parr*, was born, it is said, in 1483 at Winnington, Shropshire, and died in 1635, he being then in his 152d year. A metrical account of his career was published in 1635 by John Taylor the 'water poet,' and he was buried in Westminster Abbey, where a monument records his longevity. His age, however, has been disputed, and doubtless he was not nearly so old as represented.

Parrakeet, or PAROQUET. See *Parakeet*.

Parrha'sius, a Greek painter, born at Ephesus, flourished about 420 B.C. Several of his pictures are mentioned by ancient authors, but none of them has been preserved.

Parrot, a name common to birds of the family Psittacidæ, of the order Scansores or climbers. The bill is hooked and rounded on all sides, and is much used in climbing.

Psittacidæ.

1, Head and foot of Macaw (*Macrocercus aracanga*). 2, Do. of Blue-bellied Lorikeet (*Trichoglossus Swainsonii*). 3, Do. of Goliath Aratoo (*Microglossus aterrimus*). 4, Head of Gray Parrot (*Psittacus erythacus*).

The tarsi are generally short and strong, the toes being arranged two forwards and two backwards. The tongue, unlike that of most other birds, is soft and fleshy throughout its whole extent. The wings are of moderate size, but the tail is often elongated, and in some cases assists in climbing. The plumage is generally brilliant. Parrots breed in hollow trees, and subsist on fruits and seeds. Several species can not only imitate the various tones of the human voice, but also exercise in some cases actual conversational powers. Some live to a great age, instances being known of these birds reaching seventy and even ninety years. The species are numerous, and are known under the various names of parrots, parakeets, macaws, lorikeets, lories, and cocka-

toos (see these articles), the name parrot, when used distinctively, being generally applied to species of some size, that have a strongly hooked upper mandible and a tail short or of medium length. They are natives of both tropical and sub-tropical regions, and even extend northwards into the U. States, and south to the Straits of Magellan, New Zealand, and Tasmania. The best-known species is the Gray Parrot (*Psittăcus erythăcus*) of Western Africa, which can be most easily trained to talk. The Green Parrots (*Chrysōtis*) are also common as domestic pets, being brought from the tropical regions of South America. The Carolina parrot (*Conūrus carolinensis*) is found in the U. States, and is gregarious in its habits.

Parrot-coal, a name given in Scotland to cannel-coal. Miners distinguish this coal into two varieties—viz. 'dry' or gas parrot, and 'soft' or oil parrot.

Parrot-fish, a fish of the genus *Scarus*, family Labridæ, remarkable for the beak-like plates into which the teeth of either jaw are united, and for their brilliancy of colour, from one or other of which circumstances they have received their popular name. Most of the species are tropical, but one, *S. cretensis*, the *scarus* of the ancients, and esteemed by them the most delicate of all fishes, is found in the Mediterranean.

Parry, Sir William Edward, born at Bath 1790, died 1855. He joined the navy in 1803, became lieutenant in 1810, took part in the successful expedition up the Connecticut River in 1813, and continued on the North American station till 1817. In the following year he was appointed commander of the *Alexander* in an expedition to the Arctic regions under Sir John Ross, and during the succeeding nine years he commanded various expeditions on his own account in efforts to find a north-west passage, and to reach the north pole. He afterwards filled various government situations, became rear-admiral of the white, lieutenant-governor of Greenwich Hospital, and received the honour of knighthood. He published several volumes, in which he narrated his voyages and adventures.

Parsees', the name given in India to the fire-worshipping followers of Zoroaster, chiefly settled in Bombay, Surat, &c., where they are amongst the most successful merchants. They have a great reverence for fire in all its forms, since they find in it the symbol of the good deity Ahurâ-Mazda (Ormuzd). To this divinity they have dedicated 'fire-temples,' on whose altar the sacred flame is kept continually burning. Benevolence is the chief practical precept of their religion, and their practice of this finds its evidence in their many charitable institutions. One of the most curious of their customs is in the disposal of their dead. For this they erect what are called 'towers of silence,' built of stone, about 25 ft. high, and with a small door to admit the corpse. Inside is a large pit with a raised circular platform round it on which the body is exposed that it may be denuded of flesh by vultures, after which the bones drop through an iron grating into the pit below. The number of Parsees in India at last census (1881) was 72,065. See *Guebres*.

Parsley, a plant of the nat. order Umbelliferæ, one species of which, the common parsley (*Petroselīnum satīvum*), is a well-known garden vegetable, used for communicating an aromatic and agreeable flavour to soups and other dishes. It is a native of Sardinia, introduced into Britain about the middle of the 16th century. A variety with curled leaflets is generally preferred to that with plain leaflets, as being finer flavoured. Hamburg parsley, a variety with a large white root like a carrot, is cultivated for its roots, and much in the same way as carrots or parsnips.

Parsnip, a plant of the genus *Pastināca*, nat. order Umbelliferæ, the *P. satīva* (common or garden parsnip), of which there are many varieties. It is a tall erect plant, with pinnate leaves and bright-yellow flowers, common throughout England and in most parts of Europe and America, and much cultivated for its roots, which have been used as an esculent from a very early period. They are also cultivated as food for the use of cattle.

Parson, in English ecclesiastical law, is the rector or incumbent of a parish; also, in a wider sense, any one that has a parochial charge or cure of souls. Four requisites are necessary to constitute a parson, viz.: holy orders, presentation, institution, and induction. His duties consist chiefly of performing divine service and administering the sacraments. In the United States parson is synonymous, in common speech, with minister, preacher or clergyman.

Parsonstown, formerly called Birr, a market town in King's County, Ireland, on the river Little Brosna, about 90 miles S.W. of Dublin. The modern parts are well

built and regularly laid out in streets and squares. Birr Castle, the seat of the Earl of Rosse, with its famous telescope, closely adjoins the town. Pop. 4955.

Parsons, Labette co., Kansas, has car-works and machine-shops. Pop. 1890, 6736.

Parterre, a system of garden flower-beds arranged in a design, with turf or gravel spaces intervening. Also applied to the pit of a French theatre.

Parthenogen'esis (Greek, *parthenos*, a virgin; *genesis*, birth), in zoology, a term applied to the production of new individuals from virgin females by means of ova, which are enabled to develop themselves without the contact of the male element. We find several examples of this peculiar phenomenon among insects. The most notable are the aphides or plant-lice, whose fertilized ova, deposited in the autumn, lie without apparent development throughout the winter, and in the following spring produce modified females only. These females, without sexual contact with the males, give birth to a second generation like to themselves, and this form of reproduction is indefinitely repeated. In the succeeding autumn, however, male insects appear in the brood, and the ova are again impregnated with the male element. In this case parthenogenesis has more the appearance of alternate generation. Perhaps the truest instance of parthenogenesis is found in the unfertilized queen-bee, which deposits eggs out of which male or drone-bees are hatched. The eggs which produce neuters or females are impregnated in the usual way, but the eggs which produce the males are not fertilized. In the silk-worm moth certain females, without fertilization, produce eggs from which ordinary larvæ are duly developed.

Par'thenon (Gr., from *parthenos*, a virgin, *i.e.* Athena or Minerva), a celebrated Grecian temple of Athena, on the Acropolis of Athens, one of the finest monuments of ancient architecture. It is built of marble, in the Doric style, and had originally 8 columns on each of the two fronts, with 17 columns on the sides, or 46 in all, of which 32 are still standing; length 228 feet, breadth 101, and height to the apex of the pediments 64 feet; height of columns 34 feet 3 inches. The pediments were filled with large statues, the metopes adorned with sculptures in relief. After serving as a Christian church and as a mosque, it was rendered useless for any such purpose in 1687 by the explosion of a quantity of gunpowder which the Turks had placed in it during the siege of Athens by the Venetians. Though the more precious pieces of sculpture have been dispersed among various European collections (see *Elgin Marbles*), the Parthenon still bears an imposing aspect.

Parthenope'an Republic was the name given to the state into which the Kingdom of Naples was transformed by the French republicans in 1799; but the republic existed only for five months.

Parthia, in the widest sense, was the Parthian Empire, lying between the Euphrates, the Oxus, the Caspian Sea, and the Arabian Sea. In the narrowest sense Parthia was the small country formerly inhabited by the Parthians, and situated in the north-western part of the modern Persian province of Khorasan. The Parthians were of Scythian origin, fought only on horseback, and were celebrated for their skill in archery. They were subject successively to Persians, Macedonians, and Syrians, and they resisted the Romans with various fortune. The Parthian dynasty, founded by Arsaces (256 B.C.), was succeeded by the Sassanidæ, the latter being founded by Artaxerxes (214 A.D.), a Persian, who conquered all Central Asia. These again were followed by the conquering Mohammedans. See *Persia*.

Participle (Latin, *participium*), in gram. a part of speech, so called because it partakes of the character both of a verb and an adjective. The participle differs from the adjective in that it implies time, and therefore applies to a specific act, whereas the adjective designates only an attribute, as a habitual quality or characteristic, without regard to time. When we say, 'he has *learned* his lesson,' we have regard to a specific act done at a certain time; but in the phrase 'a *learned* man,' *learned* designates a habitual quality. In the former case *learned* is a participle: in the latter, an adjective. There are two participles in English: the present—ending in *-ing*, and the past—ending, in regular verbs, in *-ed*.

Partick, a police burgh, Scotland, county of Lanark, on the Kelvin and the Clyde, adjoining Glasgow on the west. It has flour-mills, engineering works, ship-building yards, &c. It gives name to a parliamentary division of Lanarkshire. Pop. 1891, 36,538.

Particles, such parts of speech as are incapable of any inflection, as, for instance, the preposition, conjunction, &c.

Partnership is the association of two or more persons for the purpose of undertaking

and prosecuting conjointly any business, occupation, or calling; or a voluntary contract by words or writing, between two or more persons, for joining together their money, goods, labour, skill, or all or any of them, upon an agreement that the gain or loss shall be divided in certain proportions amongst them, depending upon the amount of money, capital, stock, &c., furnished by each partner. Partnership may be constituted by certain acts connected with the undertaking apart from any deed or oral contract. The duration of the partnership may be limited by the contract or agreement, or it may be left indefinite, subject to be dissolved by mutual consent. The members of a partnership are called *nominal* when they have not any actual interest in the trade or business, or its profits; but, by allowing their names to be used, hold themselves out to the world as apparently having an interest; *dormant* or *sleeping*, when they are merely passive in the firm, in contradistinction to those who are active and conduct the business as principals, and who are known as *ostensible* partners. A partnership may be limited to a particular transaction or branch of business, without comprehending all the adventures in which any one partner may embark, but such reservation must be specified in the deed of contract. For in the usual course each member of a partnership is liable at common law for the debts of the firm, and a sleeping partner is responsible for all debts of the firm which have been contracted during his partnership. The powers of partners are very extensive, and the contract or other act of any member or members of the associated body in matters relating to the joint concern is, in point of law, the contract or act of the whole, and consequently binding upon the whole, to the extent of rendering each liable for it individually as well as in respect of the partnership property. This power does not extend to matters extraneous to the joint concern. Partners, though they should act in a fraudulent manner as respects their copartners, bind the firm in all matters connected with its peculiar dealings.

Partridge, a well-known rasorial bird of the grouse family (Tetraonidæ). The common partridge (*Perdix cinereus*) is the most plentiful of all game-birds in Britain, and occurs in nearly all parts of Europe, in North Africa, and in some parts of Western Asia. The wings and tail are short, the tarsi as well as the toes naked, and the tarsi not spurred. The greater part of the plumage is ash-gray finely varied with brown and black. They feed on grain and other

Red-legged Partridge (*Perdix rufus*).

seeds, insects and their larvæ and pupæ, and are chiefly found in cultivated grounds. Besides this species there are the red-legged, French, or Guernsey partridge (*P.* or *Caccabis rufus*), which may now be found in considerable numbers in different parts of England; the Greek partridge (*P. saxatilis*), the African partridge, the Arabian partridge, the Indian partridge. The name partridge is applied in the United States to several North American species of the genus *Ortyx* or quails.

Partridge-berry, a plant of the heath family, the *Gaultheria procumbens*, inhabiting North America, also known as wintergreen. The name is also applied to another North American shrub, *Mitchella repens*, a pretty little trailing plant, with white fragrant flowers and scarlet berries, nat. order Rubiaceæ.

Partridge Pigeon, a name for some of the Australian pigeons, otherwise called bronze-wings (which see).

Partridge-wood, a very pretty hardwood obtained from the West Indies and Brazil, and much esteemed for cabinet-work. It is generally of a reddish colour, in various shades from light to dark, the shades being mingled in thin streaks. It is said to be yielded by a leguminous tree, *Andira inermis*, and other South American and West Indian trees.

Parts of Speech are the classes into which words are divided in virtue of the special functions which they discharge in the sentence. Properly speaking there are only seven such classes, namely the noun, adjective, pronoun, verb, adverb, preposition, and conjunction; for the article, which is usually classed as a separate part of speech, is essen-

tially an adjective, while the interjection can hardly be said to belong to articulate speech at all. Each of the parts of speech will be found separately treated under their several heads throughout the work.

Party-wall is the wall that separates two houses from one another. Such a wall, together with the land upon which it stands, belongs equally to the landlords of the two tenements, half belonging to the one and half to the other.

Parvis, PARVISE, the name given in the middle ages to the vacant space before a church, but now applied to the area round a church.

Pascal, BLAISE, a French philosopher and mathematician, born at Clermont, in Auvergne, 1623, died 1662. In early youth he showed a decided inclination for geometry, and so rapid was his advance that while yet in his sixteenth year he wrote a treatise on conic sections, which received the astonished commendation of Descartes. His studies in languages, logic, physics, and philosophy were pursued with such assiduity that his health was irrecoverably gone in his eighteenth year. In 1647 he invented a calculating machine, and about the same time he made several discoveries concerning the equilibrium of fluids, the weight of the atmosphere, &c. He now came under the influence of the Jansenists Arnauld and others, and from 1654 he lived much at the monastery of Port Royal, and partly accepted its rigorous rule, though he never actually became a solitaire. He afterwards retired to a country estate, and finally returned to Paris, where he closed a life of almost unbroken ill-health. About 1655 he wrote, in defence of his Jansenist friend Arnauld, his famous Provincial Letters (Lettres Écrites par Louis de Montalte à un Provincial de ses Amis), and after his death his Pensées or Thoughts were published as the fragments of an unfinished apology for Christianity. The latter, however, for long appeared in a garbled and corrupt form, and it is only lately that anything like a pure text has appeared. Of the Lettres there are many trustworthy editions.

Pasco. See *Cerro de Pasco.*

Pas-de-Calais (pä-dė-kà-lā), a maritime department of Northern France; area, 2550 square miles. Its coast, extending about 80 miles, presents a long tract of low sandhills, but near Boulogne forms a lofty crumbling cliff. The interior is generally flat, the streams and canals are numerous, and the soil fertile and well cultivated. The principal harbours are Boulogne and Calais. The chief minerals are indifferent coal, good pipe and potter's clay, and excellent sandstone. There are numerous iron-foundries, glass-works, potteries, tanneries, bleachworks, mills, and factories of all kinds. The capital is Arras. Pop. 1891, 874,364.

Pasewalk (pä'zė-vâlk), a town of Prussia, government of Stettin, 27 miles from the town of that name, situated on the Ucker. Its industries embrace iron-founding, starch, tobacco, &c. Pop. 9514.

Pasha, in Turkey, an honorary title originally bestowed on princes of the blood, but now conferred upon military commanders of high rank and the governors of provinces. There are three grades, each distinguished by a number of horse-tails waving from a lance, the distinctive badge of a pasha. Three horse-tails are allotted to the highest dignitaries; the pashas of two tails are generally the governors of the more important provinces; and the lowest rank, of one tail, is filled by minor provincial governors. Spelled also *Pacha* (the French spelling).

Pasht, in Egyptian mythology, a goddess chiefly worshipped in Bubastus, in Lower Egypt, whence her alternative name of *Bubastes.* She was said to be the daughter of the great goddess Isis. She was represented with the head of a cat, the animal sacred to her.

Pasque Flower, the name given to *Anemone Pulsatilla*, nat. order Ranunculaceæ, a plant with purplish flowers found on the continent of Europe, and so named because its petals are frequently used to dye Easter or *pasque* eggs. The flower blossoms in spring, and its leaves when crushed emit an acrid poisonous juice.

Pasquil. See *Pasquinade.*

Pas'quinade, a lampoon or short satirical publication, deriving its name from *Pasquino*, a tailor (others say a cobbler, and others again a barber) who lived about the end of the 15th century in Rome, and who was much noted for his caustic wit and satire. Soon after his death satirical placards were attached to a mutilated statue which had been dug up opposite his shop. His name was transferred to the statue, and the term *pasquil* or *pasquinade* applied to the placards in which the wags of Rome lampooned well-known personages.

Passaic, Passaic co., N. J., 11 m. N. W. of Jersey City, has manuf. of considerable importance. Pop. 1890, 13,028.

Passamaquod'dy Bay, a bay opening out of the Bay of Fundy, and lying between the state of Maine and New Brunswick in North America. It is about 13 miles long and 6 miles wide, and is dotted with islands which make a safe harbour for the thriving town of Eastport.

Passant, in heraldry, a term applied to a lion or other animal in a shield, appearing to walk leisurely, looking straight before him, so that he is seen in profile; when the full face is shown the term *passant gardant* is employed; and when the head is turned fairly round, as if the animal were looking behind, it is *passant regardant*.

Passarowitz, Peace of, concluded July 21, 1718, by Venice and the Emperor Charles VI. with the Porte at Passarowitz, a small town of Servia, at the confluence of the Morawa and the Danube. It terminated the war begun in 1714 by the Porte, and in which the Turks gained the Morea in 1715.

Passau (pàs'sou), a town of Bavaria, picturesquely situated on a rocky tongue of land formed by the confluence of the Inn and Danube, 91 miles E.N.E. of Munich, on the south-east frontier of the kingdom. The principal buildings are the cathedral, an important example of 17th century work; the bishop's palace; church of St. Michael; Jesuit College, now a lyceum; the town-house, gymnasium, library, &c. There is an important trade in timber. The fortress of Oberhaus crowns a precipitous wooded height (426 feet) on the left bank of the Danube opposite Passau. Pop. 15,365.

Passenger Pigeon, a bird of the Pigeon family, which abounds in America. It is the *Ectopistes migratorius*, and is distinguished from the common pigeon chiefly by its long graduated tail. It is about 15 inches in length, with finely-tinted plumage, small head, and long wings. The multiplication of these pigeons is so rapid, and their destructive power so great, that they are obliged to migrate from place to place in vast flocks to obtain their food. They fly in dense columns at a great height, and such a column, one mile broad and 140 miles long, has been observed. The larger breeding-places are said to cover a forest area of about 40 miles.

Passengers. In law the railway and other public carriers contract to carry passengers without any negligence on their (the carriers') part. In case of accident it lies on the carrier to show that it was from no fault or negligence on his part, or on the part of his servants, that the accident occurred. Hence all passengers injured (or in case of death their nearest relatives) have a claim for compensation, unless it can be proved that the accident was due to the fault of the passenger. Passengers by sea are carried subject to the same general law as those by land: the carriers are bound to observe all due precautions to prevent accident or delay. No passenger ship having fifty persons on board, and the computed voyage exceeding eighty days by sailing vessels or forty-five by steamers, can proceed on its voyage without a duly qualified medical practitioner on board. In the case of imminent danger from tempest or enemies passengers may be called upon by the master or commander of the ship to lend their assistance for the general safety.

Passeres (pas'e-rēz), the name given by Linnæus and Cuvier to the extensive order of birds also called Insessores or perchers. See *Insessores, Ornithology*.

Passing-bell, the bell that was rung in former times at the hour of a person's death, from the belief that devils lay in wait to afflict the soul the moment when it escaped from the body, and that bells had the power to terrify evil spirits. In the proper sense of the term it has now ceased to be heard, but the tolling of bells at deaths or funerals is still a usage, more particularly as a mark of respect.

Passion, The, a name for the crucifixion of Jesus and its attendant sufferings.

Passion-flower (*Passiflōra*), a large genus of twining plants belonging to the natural order Passifloraceæ. They are all twining plants, often scrambling over trees to a considerable length, and in many cases are most beautiful objects, on account of their large, rich, or gaily-coloured flowers, which are often succeeded by orange-coloured edible fruits, for which indeed they are chiefly valued in the countries where they grow wild. *Passiflora laurifolia* produces the water-lemon of the West Indies, and *P. maliformis* bears the sweet calabash. The name is applied more especially to *P. cærulĕa*, which is commonly cultivated in England out of doors, and is the one to which the genus owes its name.

Passionists, a religious order in the Church of Rome, founded in 1737. The members practise many austerities; they go barefooted, rise at midnight to recite the canonical hours, &c. It is also known as the Order of the Holy Cross and the Passion of Christ.

Passion-play, a mystery or miracle-play representing the different scenes in the passion of Christ. The passion-play is still extant in the periodic representations at Oberammergau (which see).

Passion-week. See *Holy Week*.

Passive, in grammar, a term applied to certain verbal forms or inflections expressive of suffering or being affected by some action, or expressing that the nominative is the object of some action or feeling; as, she *is loved* and *admired*.

Passom'eter, a small machine, with a dial and index-hands like a watch, carried by pedestrians to record their steps in walking; a sort of hodometer.

Pas'sover, a feast of the Jews, instituted to commemorate the providential escape of the Hebrews in Egypt, when God, smiting the first-born of the Egyptians, *passed over* the houses of the Israelites, which were marked with the blood of the paschal lamb. It was celebrated on the first full moon of the spring, from the 14th to the 21st of the month Nisan, which was the first month of the sacred year. During the eight days of the feast the Israelites were permitted to eat only unleavened bread, hence the passover was also called the 'feast of unleavened bread.' Every householder with his family ate on the first evening a lamb killed by the priest, which was served up without breaking the bones. The passover was the principal Jewish festival.

Passport, a warrant of protection and authority to travel, granted to persons moving from place to place, by a competent authority. In some states no foreigner is allowed to travel without a passport from his government, and in all cases the visitor to the continent of Europe is wiser to provide himself with one, if only as a means of identification. In Russia and Turkey, in particular, a passport is indispensable. Passports to British subjects are granted at the Foreign Office, London. In the United States passports, with description of the applicant, are issued by the State Department at Washington. They are good for two years from date, renewable by stating the date and number of the old one. The fee required is one dollar. They are issued only to citizens, native-born and naturalized.

Pasta, Giuditta, operatic singer, born at Como, near Milan, in 1798, of Jewish parents, died 1865. She appeared at first without success, but in 1819–22 her reputation steadily increased, and up till 1833 she held one of the foremost places on the lyric stage, which she then quitted. She was specially distinguished in the tragic opera; Bellini wrote for her his Norma and Sonnambula, and she made the roles of Medea, Desdemona, and Semiramide her own.

Paste, a composition in which there is just sufficient moisture to soften without liquefying the mass, as the paste made of flour used in cookery. The term is also applied to a highly refractive variety of glass, a composition of pounded rock-crystal melted with alkaline salts, and coloured with metallic oxides: used for making imitation gems. One variety of it is called *Strass*.

Pastel, or Pastil, a coloured crayon. *Pastel painting*. See *Crayon*.

Pastern, the part of a horse's leg between the joint next the foot and the coronet of the hoof: it answers to the first phalanx of a man's finger.

Pasteur (pàs-t*eur*), Louis, French chemist and physicist, born at Dôle, Jura, 1822; educated at Jena University and the École Normale, Paris, where in 1847 he took his degree as doctor. The following year

M. Louis Pasteur.

he was appointed professor of physics in Strasburg, where he devoted much research to the subject of fermentation; in 1857 he received the appointment of dean in the Faculty of Sciences, Lille; in 1863 he became professor of geology, chemistry, and physics at the École des Beaux-Arts, Paris; and in 1867 professor of chemistry at the Sorbonne. He became a member

of the French Academy in 1882. He has been especially successful in proving the part played by microbes in fermentation and decomposition, in introducing a successful treatment of disease in silkworms and cattle, and has achieved great success in his efforts to check hydrophobia by means of inoculation. To enable him to deal with this disease under the best conditions a *Pasteur Institute* was been opened in Paris, where patients are received from all parts of Europe. Died in 1895. See *Hydrophobia.*

Pasticcio (pàs-tich'ō), in music, an opera, cantata, or other work, the separate numbers of which are gleaned from the compositions of various authors, or from several disconnected works of one author. In art the term is applied to a work which, though original in subject, is in treatment and execution in the direct manner of another artist.

Pastille', or PASTIL', a mixture of odorous gum-resin made up into small cones and burned in an apartment to give it a pleasant perfume. Pastilles are also made into pills, and used by smokers to give the breath an aromatic odour.

Pasto, a town of the Republic of Colombia, dep. Cauca, founded in 1539. Pop. 5500.

Paston Letters, THE, a collection of letters written by and to members of the Paston family in Norfolk during the period of the wars of the Roses, four volumes of which were published by Mr. (afterwards Sir) John Fenn, and a fifth by his literary executor, Sergeant Frere (London, 1787–89 and 1823). These letters deal freely with the domestic affairs, the interests in public movements, the intriguing at elections, and the lawsuits of this particular family, and all the relations of English popular life in the period in which they were written. An accurate and extended edition in 3 vols. by Mr. Gairdner has been published (1872–75).

Pastor, a genus of birds belonging to the starling family, found in the north of Africa, Syria, and India. The rose-coloured pastor (*P. rosĕus*) is a favourite song bird.

Pastor, the regularly ordained preacher of a congregation of worshippers.

Pastoral Letters are circulars addressed by a bishop to the clergy or laity under his jurisdiction at certain stated times or on special occasions for purposes of instruction or admonition.

Pastoral Poetry, poetry which deals, in a more or less direct form, with rustic life. It has generally flourished in highly-corrupted artificial states of society. Thus it was that Theocritus, the first pastoral poet, made artistic protest against the licentiousness of Syracuse; and Virgil wrote his Bucolics and Eclogues in the corrupt Roman court. In the 16th century pastoral poetry received its most notable expression in the Arcadia of G. Sannazaro, the Aminta of Tasso, and the Pastor Fido of Guarini. This tendency, which was so potent in Italy, spread to England, and influenced the Shepherd's Calendar of Spenser, the Arcadia of Sidney, the Faithful Shepherdess of Fletcher, As You Like It of Shakspere, and the Comus of Milton. The Gentle Shepherd of Allan Ramsay (1725) was the last successful dramatic pastoral.

Pastoral Ring, a ring worn by bishops on the ring-finger of the right hand.

Pastoral Staff, the official staff of a bishop or abbot. It is of metal, or of wood ornamented with metal, and has the head curved in the form of a shepherd's crook as a symbol of the pastoral office. See *Crosier.*

Pastoral Theology, that part of theology which treats of the obligations of the pastors themselves, and which is therefore designed for the training and preparation of the candidates for the pastoral office.

Pastry, articles of food made of paste or dough, which has been worked up with butter or fat, so that it assumes a light flaky appearance. There are several varieties, such as puff-paste, paste for raised pies, and a light spongy kind called *brioche.* Pastry as a rule is somewhat indigestible.

Pastures, land under grass and herbage, which is eaten as it grows by horses, oxen, sheep, and other herbivorous animals. On the uplands of Great Britain, where grain crops cannot be profitably cultivated, and in some of the most fertile plains and valleys of England and Ireland, there are large tracts which have been under grass for hundreds of years. First-class pastures are used for feeding heavy oxen; second class for inferior or dairy cattle; while hill-sides, moors, and uplands are utilized for sheep. By the Agricultural Holdings Act of 1883 an outgoing tenant is entitled to compensation for permanent pastures laid down with the consent of the landlord. See *Common.*

Pata'gium is the name applied to the expansion of the skin or integumentary membrane by means of which bats, flying squirrels, flying lizards, and other semi-aerial forms support themselves in the air. This membrane is not a true wing, but is used as a kind of parachute for temporary support.

Patago'nia is the name applied to that extreme portion of South America which is bounded E. by the Atlantic, W. by the Pacific, S. by the Strait of Magellan, and N. by the Rio Negro. Since 1881 this large territory has been, by treaty, divided between Chili and the Argentine Republic, so that the portion west of the Andes (63,000 square miles) belongs now to the former, and the portion east of the Andes (360,000) belongs to the latter. The Straits of Ma-

Patagonians.

gellan form a southern boundary of 360 miles, and separate the mainland from the innumerable islands of Tierra del Fuego. Here the Chilian government have established the settlement of Punta Arenas, with stations along the coast. Patagonia east of the Andes consists mainly of vast undulating plains, frequently covered with shingle and broken up by ridges of volcanic rock. The vegetation is scanty, except in the region adjoining the Andes, and in many places there are shallow salt-lakes and lagoons. The chief rivers are the Rio Negro, the Chupat, the Rio Desire, and the Rio Chico, all of which have their sources in the Andes, and run eastward. There are few if any good seaports. The Patagonians are a tall, muscular race averging fully 6 feet in height, with black hair, thick lips, and skin of a dark-brown colour. They are a nomad race, divided into numerous tribes, whose chief occupation is in hunting and cattle-breeding. This native population, however, never numerous, is rapidly disappearing. Colonization is encouraged by the Argentine government, and there are many tracts suitable for European settlement. The country was first discovered by Magellan in 1520.

Patamar', a vessel employed in the coasting trade of Bombay and Ceylon. Its keel has an upward curve amidships, and extends only about half the length of the vessel; the stem and stern, especially the former, have great rake; and the draught of water is much greater at the head than at the stern. These vessels sail remarkably well, and stow a good cargo.

Patan. See *Lalitapatan.*

Patchou'li, a perfume obtained from the dried leaves and branches of the *Pogostēmon patchouli*, a labiate plant of India and China, where it is cultivated on a large scale. It is used in India to scent costly Cashmere shawls, tobacco, and hair-oil, and is everywhere valued as a preservative of woollens and linens from insects.

Pâté de foie gras (pä-tā dė fwȧ grä), a dish made from the enlarged livers of overfed geese, and much relished by epicures. It is made in the form of a pie, and from its oily nature is very indigestible.

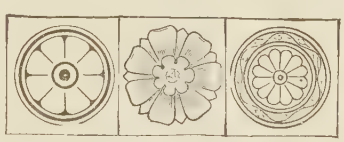
Patel'la, the name applied in anatomy to the 'knee-cap' or 'knee-pan,' the sesamoid bone of the knee.—The name is also applied to a genus of gasteropodous molluscs comprising the limpets.

Pat'en, an ecclesiastical term applied to the round metallic plate on which the bread is placed in the sacrament of the Lord's supper. It often serves as a cover for the chalice.

Pa'tent, a privilege from government granted by letters patent (whence the name), conveying to the individual or individuals specified therein the sole right to make, use, or dispose of some new invention or discovery for a certain limited period, which in Great Britain may run to fourteen years, or even longer, should the inventor be able to prove that the invention, though of great public utility, has been up till that time almost unprofitable to him. Letters patent are obtained upon petition and affidavit to the crown, addressed to the comptroller at the Patent Office, London, setting forth that the petitioner has, after great labour and expense, made a certain discovery which he describes, and which he believes will be of great public utility, and that he is the first

inventor. In accordance with the provisions of the Patent Law Amendment Act, 1852, provisional protection commences on the day of petitioning for letters patent, and the statute requires that the petition be accompanied by a declaration and statement of the nature of the invention. These documents are referred to one of the law officers of the crown, who, if he be satisfied with the statement of the invention, grants a certificate of provisional protection, to remain in force during six months from the date of application, pending which the invention may be used and published without prejudice to the validity of any letters patent subsequently granted for the invention. The statute also allows that, in place of depositing a provisional specification on making application for letters patent, as was necessary under previous acts, the petitioner may at once file a complete specification of his invention, by which he secures the right, in addition to a protection for six months, of proceeding at law against any person who may infringe his claim, even before the grant is actually made, and which may never be issued. Provision is now made under the act of 1883 whereby the first fee for this legal protection shall be £1 in place of £5 under the old acts; the subsequent payments are also reduced. In Britain the applications for patents now approach 20,000 annually. Formerly, if it was intended to secure the privilege in the three kingdoms, separate patents had to be taken out for England, Scotland, and Ireland, but now only one grant is necessary for the whole. By act of 1888 patent agents have to be registered by the Board of Trade. When the rights of a patentee are being infringed he can protect them by a civil process at law, and his suit will be upheld if he can prove that the main elements of his invention have been infringed. A patent once granted can be revoked if anyone can show that the patentee is not the inventor. The patent laws vary considerably in foreign countries. In the United States under the act of 1870 a patent is granted for a period of seventeen years to the original inventor only; in France it is granted to the patentee for a term of fifteen years on payment of $20 annually; in Germany the period is fifteen years with a first payment of $7.50. The various colonies and dependencies of Great Britain have each a separate patent law. An international convention for the protection of patentees has been formed whereby equal rights are secured in all the signatory countries. In London there are a *Patent Office, Library, and Museum*, establishments brought into existence by the Patent Law Amendment Act (1852). They are under the superintendence of a comptroller under the Board of Trade, and keep a register of patents issued, and licenses granted, &c. An illustrated journal of patented inventions, and printed specifications of all patents, are issued by the office. A museum in connection with the patent office, containing models, portraits, &c., was established in 1859 at South Kensington. The Patent Office of the United States is a bureau of vast extent, its extensive museum of 300,000 models, located in a fine marble building, being one of the sights of the capital. It employs nearly 400 examiners and clerks, and issues about 20,000 patents annually, some 1500 of which are to foreigners. It issues monthly volumes in quarto, with detailed descriptions and drawings of patents, and a weekly "Official Gazette" of the Patent Office, with reduced drawings and lists of new patents.

Pat'era, a shallow, circular, saucer-like vessel used by the Greeks and Romans in their sacrifices and libations. The name is applied in architecture to the representation



Architectural Pateræ.

of a flat round dish in bas-relief, used as an ornament in friezes, &c.

Pater'culus, CAIUS VELLEIUS, an ancient Roman historian, born about 19 B. C., died about 31 A. D.

Pater'nians, a heretical sect of the 5th century, followers of *Paternus*, who are said to have held that God made the nobler parts of man and Satan the lower. Hence they served God with the former parts and the devil with the latter.

Paternò, an ancient town of Sicily, 10 miles north-west of Catania, at the foot of Mt. Etna. In the vicinity are mineral springs and the remains of baths, an aqueduct, &c. Pop. 15,178.

Paternoster (Latin, 'Our Father'), the opening words of the Latin version of the

Lord's prayer, hence employed to designate the prayer itself. See *Lord's Prayer*.

Pat'erson, a city of the United States, the seat of Passaic county, New Jersey, on both sides of the Passaic, near its celebrated falls, and 16 miles north-west from New York. The town was founded in 1792, and now possesses numerous churches, a court-house, jail, library, &c. The falls, 50 ft. high, are within the city limits and supply abundant water-power to the numerous cotton, silk, and woollen factories, dye and print works, iron-foundries, machine-shops, tanneries, saw, paper, and fulling mills, &c. Pop. 1890, 78,347.

Paterson, WILLIAM, financier and founder of the Bank of England, was born in Dumfriesshire 1665, died in London 1719. He went through England as a pedlar, settled for a time at Bristol, subsequently resided in the Bahama Islands. Returning to London he engaged in trade with success, and in 1694 proposed and founded the Bank of England, being one of its first directors. Before this time he had conceived the project of founding a free emporium of trade in Darien, and in 1695 he obtained the sanction of a Scottish act of parliament constituting the Darien Company. (See *Darien Scheme.*) After the failure of this great scheme he returned to England, broken in health and fortune. When the Treaty of Union between England and Scotland was concluded in 1707, Paterson, who was one of its warmest advocates, after much difficulty received an indemnity (of £18,000) for the losses he had sustained. Paterson was a great financial genius, but most of his views (such as his advocacy of free-trade) were far in advance of his time.

Pathology, that part of medicine which explains the nature of diseases, their causes and symptoms, comprehending nosology, etiology, and symptomatology. Pathology may be divided into *general pathology*, which regards what is common to a number of diseases taken as a class; and *special pathology*, which treats of individual diseases.

Patia'la, an Indian native state in the jurisdiction of the Punjab government, the larger part of which is situated south of the Sutlej and the other part in the hill country near Simla; area, 5887 square miles. Besides the usual agricultural products, the state has slate, lead, marble, and copper mines. The Mahárája of Patiala has been of service to the British government on several critical occasions, such as the mutiny of 1857, and for this loyalty he has been rewarded by an increase of territory. Pop. of the state, 1,467,433. The capital is Patiala, 130 miles S.E. of Amritsir. It was founded in 1752 by Sardar Ala Singh, and has a pop. of 53,629.

Pat'ina, in the fine arts, the fine green rust with which ancient bronzes and copper coins and medals become covered by lying in particular soils, which, like varnish, is at once preservative and ornamental. An artificial patina is produced by the forgers of antiquities by acting on them with acetic acid, but it is not durable.

Patmore, COVENTRY KEARSEY DEIGHTON, English poet, born in 1823. He published his first volume of poems in 1844, became assistant librarian at the British Museum, and associated himself with the pre-Raphaelite movement. His reputation as a poet was established by the publication of the four parts of The Angel in the House (1854-63), which he has revised in successive editions. Besides this he has published The Unknown Eros and other Odes, a poetical anthology called the Children's Garland, a Memoir of B. W. Proctor (Barry Cornwall), and several contributions to periodicals.

Patmos, an island of Turkey in Asia, in the Grecian Archipelago, about 26 miles S.S.W. of Samos; greatest length, 12 miles; breadth, nearly 6. The island is an irregular mass of barren rock, agricultural products are scanty, and the population (mostly Greeks) find their chief occupation in fishing. Near the excellent natural harbour of La Scala is the small town of Patmos, overlooked by the old monastery of St. John, in a grotto of which, it is said, the Apostle John saw his apocalyptic visions. Pop. about 4000.

Patna, a city of Hindustan, in the lieutenant-governorship of Bengal, situated on the Ganges near its junction with the Son and the Gandak, and about 400 miles north-west from Calcutta. It extends for 9 miles along the river, from which its tombs, mosques, and monuments present a fine appearance. On the west side is the suburb of Bankipur, where the government offices and European residences are situated. By reason of its central position and natural advantages the city is an important business centre, and the chief seat of the opium trade. Pop. 170,654.—The district of PATNA has an area of 2079 square miles, for the most flat and exceedingly fertile. The staple crop is rice, and the other products are wheat, barley, cotton, tobacco, and sugar-cane. Pop. 1,756,856.

Patna, a native state in the Central Provinces of India. The country is hilly, and its large forests are infested by tigers, leopards, &c., while about a fourth of its area of 2400 sq. miles is cultivated. It is now under direct British supervision. Pop. 257,959.

Patois (pà-twä), a French word of unknown origin used to denote a dialect spoken by the rustic, provincial, or uneducated classes.

Paton, Sir Joseph Noel, R.S.A., historical painter, was born at Dunfermline in 1821. He studied for some time at the Royal Academy; attracted attention by his outline etchings illustrative of Shakspere and Shelley; exhibited his first picture of Ruth Gleaning at Edinburgh in 1844; gained one of three premiums at the Westminster competition by his fresco of the Spirit of Religion, and a prize of £300 by his paintings Christ Bearing the Cross and The Reconciliation of Oberon and Titania. During subsequent years he has produced many pictures, well known by engravings, such as The Pursuit of Pleasure, Home—a soldier's return from the Crimea, In Memoriam—a scene from the relief of Lucknow, Mors Janua Vitæ, Faith and Reason, Lux in Tenebris, The Man with the Muck-rake, &c. He has also published two volumes of verse.

Patras, a fortified seaport and important trading town of Greece, in the north-west of the Morea, on the east side of the gulf of same name. The public buildings include several churches, hospitals, and a celebrated castle of great strength. There is an important trade in currants. Pop. 25,494.—The Gulf of Patras lies between the north-west part of the Morea and Northern Greece, and communicates on the east with the Gulf of Lepanto.

Patriarchs (from the Greek *patria*, tribe, *archein*, to rule) are the antediluvian heads of families, and the three fathers of the Hebrew race, Abraham, Isaac, and Jacob. The term at a later period became the title of the presidents of the sanhedrim, which exercised a general authority over the Jews of Syria and Persia after the destruction of Jerusalem. From them the title was adopted by the Christians, who applied it, from the beginning of the 5th century, to the bishops of Rome, Constantinople, Alexandria, Antioch, and Jerusalem. The Patriarch of Rome became the supreme pontiff of the West (see *Popes*), the four heads of the Eastern church preserving the title of patriarch. The Patriarch of Constantinople is the primate of the Greek Church in the Ottoman Empire, and bears the title of *œcumenical*.

Patricians (Latin, *patricius*, from *pater*, father), the name given by the Romans to the members and descendants by blood or adoption of the original *gentes*, houses or clans who, after the plebeians became a distinct order, constituted the aristocracy of the city and territory. See *Rome*.

Patrick (Patricius), St., the apostle of Ireland, was born about 396 in the British Roman province of Valentia, probably at Nemthur on the Clyde where Dumbarton now is. His father, a decurion in the Roman army, retired to a farm on the Solway, whence, at the age of sixteen, Patrick was carried off by a band of marauders and sold as a slave to the Irish Picts of county Antrim. After six years he made his escape, and, resolving to devote himself to the conversion of Ireland, prepared himself for the priesthood, probably at the monastic institution founded by St. Ninian at Candida Casa (Whithorn) in Galloway. Having been ordained a bishop and received the papal benediction from Celestine I., he went over to Ireland about the year 432. Here he is said to have founded over 360 churches, baptized with his own hand more than 12,000 persons, and ordained a great number of priests. The date of his death is probably 469; it took place at a place called Saul, near Downpatrick, and his relics were preserved at Downpatrick till the time of the Reformation. His authentic literary remains consist of his Confessions and a letter addressed to a Welsh chief named Corotic. The existence of other two Irish apostles, Patrick or Palladius, and Senn (old) Patrick, about the same time has caused much confusion in the history of the early Irish church.

Patrick, St., Order of, an Irish order of knighthood, instituted in 1783 by George III., originally consisting of the sovereign, the lord-lieutenant of Ireland for the time being (who is the grandmaster of the order), and fifteen knights; but by a statute in 1833 the order was enlarged and the number of knights raised to twenty-two. The badge of the order is of gold, oval in shape, with the cross of St. Patrick surmounted by a shamrock in the centre, and round this is a blue enamelled band bearing the motto 'Quis separabit.' The badge is suspended to a collar of roses and harps by means of

an imperial crown and gold harp. The mantle and hood are of sky-blue tabinet, lined with white silk.

Patris'tic Theology, that branch of historical theology which is particularly devoted to the lives and doctrines of the fathers of the church.

Patroc'lus, in Greek story, the friend of Achilles, whom he accompanied to the Trojan war. His success was at first brilliant; but, Apollo having stunned him and rendered him defenceless, he was slain by Euphorbus and Hector. See *Achilles*.

Patrol', a walking or marching round by a guard in the night to watch and observe what passes, and to secure the peace and safety of a garrison, town, camp, or other place; also, the guard or persons who go the rounds for observation.

Pa'tron, in the Roman republic, a patrician who had plebeians, called *clients*, under his immediate protection, and whose interests he supported by his authority and influence. In later times the term patron was applied to every protector or influential promoter of the interests of others; hence the saints who were believed to watch over the interests of particular persons, places, or trades were called *patron saints*. See next article.

Pat'ronage, Ecclesiastical, the right of presenting a fit person to a vacant benefice. In the earlier ages the bishops appointed the holders of all benefices, but subsequently when proprietors of lands began to erect and endow churches they obtained the privilege of nominating the clergyman. For a considerable time not only the nomination but also the investiture of the clergy were in the hands of laymen; but the hierarchy began to consider this an infringement of its prerogatives, and several successive popes and councils declared that the investiture was not valid unless it had also received the sanction of the ecclesiastical authority. Ecclesiastical patronage thus came to reside mainly in the pope, and the principal benefices in Europe were filled by Italian ecclesiastics, who were often ignorant of the language of their flocks. In England this led to the Statutes of Provisors (1350–1415), by which persons who should attempt to enforce such appointments were subjected to severe penalties. In England the sovereign is the patron paramount of all benefices which do not belong to other patrons; but a vast number of livings are in the gift of private persons, who possess the *advowson* as attached to their property. (See *Advowson*.) In Scotland the statute which abolished Popery and recognized the reformed religion reserved the right of presentation to lay patrons (1567), and a subsequent statute (1592) asserted the rights of the crown and lay patrons in still stronger terms. On the establishment of Episcopacy the same principle was adopted in the act of 1612, by which presentations were appointed to be directed to the bishop. After the re-establishment of presbytery patronage was abolished (1649). It was again restored, however; again abolished; and again restored, in the last instance by the act 10 Anne, cap. xii.; and this rule remained with slight modification till 1874, when an act was passed by which the right of choosing their own minister devolved upon the congregation, the former patron to receive as compensation a sum equal to one year's stipend.

Patti, Adelina Maria Clorinda, opera-singer, born at Madrid in 1843; received her musical training from her brother-in-law, Maurice Strakosch; made her first appearance in New York in 1859 as Lucia; and in 1861 made a brilliant début at Covent Garden, London, in the parts of Amina, Violetta, Zerlina, and Martha. Since then she has successfully established her reputation as an artiste in the chief cities of Europe and America. In 1868 she married the Marquis de Caux, from whom in 1883 she obtained a divorce, and subsequently married Signor Nicolini, who died 1898.

Pattison, Mark, English writer, born in 1813, died in 1884. He was educated at Oriel College, Oxford; received a fellowship in 1839; and two years subsequently he was ordained and won the Denyer theological prize. In 1853 he was appointed tutor of his college, and in 1861 became rector (or head) of Lincoln College. He devoted himself to university reform, for this purpose made many journeys to Germany, and was assistant-commissioner on the educational commission of the Duke of Newcastle. He was a contributor to the famous Essays and Reviews, and published an edition of Pope's Epistles and Satires (1869), a work on Isaac Casaubon (1875), a memoir of Milton in the Men of Letters Series (1879), the Sonnets of Milton (1883), and numerous articles in reviews, &c.

Pau (pō), a town of France, capital of the department of Basses-Pyrénées, formerly of Béarn, picturesquely situated on a height above the right bank of the Gave-de-Pau,

in view of the Pyrenees (10 miles distant), and 58 miles E.S.E. of Bayonne. The most interesting edifice is the castle in which Henry IV. was born, crowning a rising ground and overlooking the Gave-de-Pau. It is a large irregular structure, flanked with six square towers. The oldest part is supposed to date from 1363, and the whole is well preserved. Pau is a favourite winter resort, enjoying a mild dry climate and a peculiar stillness of the atmosphere, with no sudden variations of temperature. Pop. 25,879.

Pauchonti Tree (*Isonandra polyandra*), a large tree found in the mountain regions of India, and from which a substance of the nature of gutta-percha is procured. The wood of the pauchonti is close-grained and heavy.

Paul, the apostle, commonly called SAINT PAUL, was born of Jewish parents at Tarsus, in Cilicia, and inherited the rights of a Roman citizen. He received a learned education, and early went to Jerusalem to study under Gamaliel, one of the most celebrated Jewish rabbins. Thus prepared for the office of teacher, he joined the sect of the Pharisees, and became a persecutor of the Christians, to crush whom the sanhedrim employed him both in and out of Jerusalem. He was present at and encouraged the stoning of Stephen, and it was only when he was overtaken by a vision on his way to Damascus that he became a convert to Christianity. His sudden conversion was indicated by the change of his name from *Saul* to *Paul*, and he engaged in the work of an apostle with an ardour that overcame every difficulty. Arabia, Syria, Asia Minor, Greece, and the islands of the Mediterranean were the scenes of his labours. The churches of Philippi in Macedonia, of Corinth, Galatia, and Thessalonica, honoured him as their founder; and he wrote epistles to these churches, and to the churches in the chief cities of Greece and Asia Minor. By admitting the Gentiles to the church he incurred the hatred of the Jews, who persecuted him as an apostate. Undismayed, the apostle went to Jerusalem, and was there arrested and brought to Cæsarea, where he was kept a prisoner for two years by the Roman governors Festus and Felix. He appealed, as a Roman citizen, to the emperor; and on his way to Rome, where he arrived in the year 62, he was shipwrecked on the island of Melita. At Rome he was treated with respectful kindness, and there is reason to believe that he for some time regained his liberty. According to the tradition of the early church the apostle suffered martyrdom during the reign of Nero.

Paul, the name of five popes—PAUL I., pope from 757–767, brother of Stephen II., stood on good terms with Pepin and Charlemagne.—PAUL II., pope from 1464–71, a native of Venice, originally called Pietro Barbo, caused a crusade to be preached against the Hussites.—PAUL III., pope from 1534–49, formerly Alessandro Farnese, excommunicated Henry VIII. 1535, concurred in the foundation of the order of Jesuits, opened the Council of Trent, defended himself by his legates in the conferences between Catholics and Protestants at the Diets of Worms and Ratisbon, and established a general inquisition for the suppression of Protestantism.—PAUL IV., pope from 1555–59, formerly John Peter Caraffa, energetically directed the power of the Inquisition against everything tending to favour Protestantism, and established an Index Librorum Prohibitorum.—PAUL V., pope from 1605–21, formerly Camillo Borghese, succeeded Leo XI.

Paul I., Emperor of Russia, son of Peter III. and Catharine II., was born in 1754. On the death of Catharine in 1796 he succeeded to the throne, and began his reign with acts of generosity. He put an end to the war with Persia, and liberated the Poles who were in confinement in Russia. He joined the coalition of crowns against France, and sent 100,000 men, under Suwaroff and Korsakoff, to Italy and Switzerland, and partly to Holland, but he afterwards favoured the cause of Napoleon. Paul caused himself to be declared Grand-master of the Knights of Malta (1798), but Britain, having conquered the island in 1800, refused to surrender it to the Russian emperor. He therefore laid an embargo on all British ships in the Russian ports, and prevailed upon the Swedish, Danish, and Prussian courts to enter into a convention against Great Britain. At length (1801) the internal administration and his increasing acts of tyranny gave rise to a strong popular discontent, and he was murdered in his bed March 24, 1801.

Paul, ST., Minnesota. See *Saint Paul*.

Paul, ST. VINCENT DE, Roman Catholic philanthropist, born of poor parents in Southern France in 1576, died in 1660. He was educated at Dax and Toulouse; ordained a priest in 1600; in 1605 he was

captured by pirates; remained in slavery in Tunis for two years, and finally escaped to France. He afterwards visited Rome, from whence he was sent on a mission to Paris, where he became almoner to Queen Margaret of Valois. In 1616 he began the labours which occupied so large a portion of his life, and which included the foundation of the institution called the Priests of the Mission or Lazarists, the reformation of the hospitals, the institution of the Sisterhood of Charity, the instruction of idiots at his Priory of St. Lazare, &c. Among the last acts of his life was the foundation of an asylum for aged working people of both sexes, and a hospital for all the poor of Paris, which was opened in 1657. He was canonized in 1737.

Paula, FRANCIS DE. See *Francis of Paula.*

Paulding, JAMES KIRKE, miscellaneous writer, born in Dutchess county, New York, 1779; died 1860. He removed to New York, where he became intimately acquainted with Washington Irving, and published in connection with him a series of humorous and satirical essays, entitled Salmagundi. For some years he was secretary of the United States navy. He published a second series of Salmagundi, entirely his own composition; several novels, among which are Konigsmarke, and the Dutchman's Fireside; a Life of Washington; and many political pamphlets, poems, &c.

Pauli, REINHOLD, historical writer, born at Berlin 1823, died 1882. He was educated at Berlin and Bonn; resided in London for eight years, where he was secretary to the Prussian minister; and afterwards became a professor successively at Rostock, Tübingen, and Göttingen. His published works are: A Life of King Alfred (1851), a continuation of Lappenberg's History of England, A History of England since the Treaties of 1814 and 1815, Pictures of Old England, a monograph on Simon de Montford, and Essays on English History.

Paulicians, a Christian sect founded in the 7th century in Armenia. They rejected the adoration of the Virgin and the saints; refused homage to the cross; denied the validity of the sacraments; interpreted spiritually baptism and the Lord's supper; would not recognize any priestly dignity; and their public worship was altogether free from ritual. They suffered severe persecution at the hands of the Byzantine emperors, but as late as the 16th century remnants of the sect were found in Bulgaria.

Paul's (ST.) Cathedral, London, is situated on Ludgate Hill, an elevation on the north bank of the Thames. The site of the present building was originally occupied by a church erected by Ethelbert, king of Kent, in 610. This was destroyed by fire in 1087, and another edifice, Old St. Paul's, was shortly afterwards commenced. The structure was in the Gothic style, in the form of a Latin cross, 690 feet long, 130 feet broad, with a lead-covered wooden spire rising to the height of 520 feet. The middle aisle was termed Paul's Walk, from its being frequented by idlers as well as money-lenders and general dealers. Old St. Paul's was much damaged by a fire in 1137, by lightning in 1444, again by fire in 1561, and was utterly destroyed by the great fire in 1666. The ruins remained for about eight years, when the rebuilding was taken in hand by the government of Charles II. (1675–1710). The whole building was completed at a total cost of £1,511,202 under one architect (Sir Christopher Wren), one master-mason (Thomas Strong), and one Bishop of London (Dr. Henry Compton). The building is of Portland stone, in the form of a cross. Its length is 510 feet; the width from north to south portico 282 feet; the general height is 100 feet. The whole is surmounted by a great dome raised on eight arches. Above the dome is a lantern or gallery terminated above by a ball and gilded cross, 404 feet from the pavement beneath. The elevated portico forming the grand entrance consists of twelve Corinthian columns, with an upper series of eight pillars of the composite order, supporting a pediment; the front being flanked by two bell-towers 120 feet in height. The entablature represents in relief the conversion of St. Paul, a work of Francis Bird. Upon the south front, which corresponds with the north, is a phœnix rising from the flames, with the motto, 'Resurgam' (I shall rise again). The pavement of the interior is composed of slabs of black and white marble. The crypt under the nave contains the burying-places of many illustrious personages, and some interesting relics of old St. Paul's. Among the numerous monuments and statues to the illustrious dead may be noted those of John Howard and Dr. Johnson, by Bacon; statues of Nelson, Earl Howe, and Sir Joshua Reynolds, by Flaxman; Bishop Heber, by Chantrey; and monuments to Lord Rodney, Lord Heathfield, Admiral Collingwood, General Abercrombie, &c., by

Rossi, Westmacott, and others. The monument to the Duke of Wellington, by Alfred Stevens, is accounted the finest work of its kind in England. It consists of a rich marble sarcophagus and canopy elaborately ornamented with bronze sculptures. It is 30 feet in height and cost upwards of £30,000. Various decorative, structural, and other improvements have recently been made on the interior of the cathedral.

Paul's Cross, ST., a structure partly consisting of a pulpit which stood at the north side of old St. Paul's, London; a favourite place of resort, from which sermons, political discourses, &c., used to be delivered. It was demolished in 1643.

Paul's School, ST., a London grammar or secondary school, endowed by John Colet in 1512 for 153 boys of 'every nation, country, and class.' The first building, on the east of St. Paul's Churchyard, was burned in 1666; the second, by Wren, was taken down in 1824 and another building erected. In 1884 a new school was opened at West Kensington. The Mercer's Company are patrons.

Paulus Ægine'ta, Greek medical writer, born it is supposed in the 7th century in the island of Ægina, and connected with the medical school at Alexandria. He abridged the works of Galen, and was deeply read in those of Hippocrates and others. His works have been translated into English.

Paulus Diac'onus, Italian ecclesiastic, born about 730, died about 800. He was educated in the court of the Lombard kings at Pavia. In 781 he was called to the court of Charlemagne, and was one of the principal instruments of the intellectual reforms effected by the emperor in the countries of Western Europe. Paulus drew up a book of homilies from the fathers, wrote a history of the bishops of Metz, and a history of the Lombards.

Paul Veronese. See *Veronese.*

Pauperism. See *Poor* and *Poor's Laws.*

Pausa'nias, a Lacedæmonian general, nephew of Leonidas. He commanded the allied Greeks against the Persians at the battle of Platæa in 479 B.C. To himself alone he ascribed the victory, and his pretensions became insupportable when he afterwards, with a combined Greek fleet, delivered Greece, Cyprus, and finally Byzantium from the Persian rule. At length he entered into secret negotiations with Xerxes, and conceived the design of making himself master of Greece. To escape arrest he sought shelter in the temple of Athene at Sparta, where he was shut in by the enraged people and starved to death (B.C. 467).

Pausanias, a Greek writer on mythology, history, and art who lived in the 2d century after Christ, and of whose personal history nothing is known. His Hellados Periēgēsis (Peregrination of Hellas) is an itinerary in ten books of his travels, which were extensive. He appears to have visited the whole of the Peloponnesus, Rome, Syria, and Palestine. He describes temples, theatres, tombs, statues, pictures, monuments of every sort. He also mentions mountains, rivers, and fountains, and the mythological stories connected with them. His observation is accurate, and his descriptions simple and reliable.

Pausilippo. See *Posilipo.*

Pavement, a floor or covering consisting of stones, blocks of wood, &c., laid on the ground in such a manner as to make a hard and convenient roadway. Pavements of lava, with elevated side-walks, are found in the ancient Roman cities of Herculaneum and Pompeii, and the paving of important highways was practised by the Romans. Of modern cities Paris is generally mentioned as having the oldest pavement; but it is certain that Cordova in Spain was paved about 850 A.D. In London some of the chief streets were paved in the 15th century. Holborn was first paved in 1417, the great Smithfield Market not until 1614. Street pavements in modern cities are usually of stone, asphalt, concrete, or wood. The stone commonly used for the carriage way is granite, blocks of which are placed upon a solid bed of concrete, and the interstices filled with sand and grouted with asphalt, lime, or cement. Arbroath and Caithness supply the best paving-stones for side-walks. Concrete pavement is composed of broken stone, &c., mixed with Portland or other cement or asphalt. (See *Concrete.*) Val de Travers *asphalte rock* (which see) is now commonly used for pavements. Wood-pavements have the advantage of being noiseless, but the abrasion of the surface requires frequent repair. They are laid in different ways, but the blocks which form the pavement are always placed on their ends, so that the cross surface of the wood is exposed. The spaces between the blocks are usually filled with gravel, upon which hot tar or pitch is poured.

Pa'via (Italian pron. pà-vē'à), a city of Italy, in Lombardy, 22½ miles from Milan, on the left bank of the Ticino, capital of a

province of the same name. Pavia is still partly surrounded by old walls and fortifications, and is connected with the Adriatic by the Po and Ticino, and with Milan by a canal. Of edifices the most important are the cathedral (begun in 1486), containing some good paintings, and the tomb of St. Augustine; the church of San Michele, a Romanesque edifice of the 11th century; the Castello, or castle, now a barrack, erected by Galeazzo Visconti 1360–69; the university, founded in 1361, a handsome building, with a library of about 130,000 volumes; the Collegio Borromeo, &c. The manufactures are unimportant. About 4 miles to the north is the famous Carthusian monastery Certosa di Pavia, with a magnificent church in the Gothic style, begun 1396, and with a façade that ranks as the finest decorative work of the kind in N. Italy. Pavia was a place of considerable importance during the reign of Augustus. It afterwards came into the possession of the Lombard kings, who made it their capital. It was latterly under the Milanese. Pop. 29,836.—The province, which extends on both sides of the Po, has an area of 1285 square miles, partly covered by the Apennines. Pop. 496,832.

Pavilion, in architecture, a turret or small building, usually isolated, having a tent-formed roof, whence the name. A projecting part of a building, when it is carried higher than the general structure and provided with a tent-formed roof, is also called a pavilion. Applied specifically to a building erected in 1784 at Brighton for the then Prince of Wales.

Pavlograd, a town of Southern Russia, 16 miles north-east of Ekaterinoslav, in the government of that name. Pop. 11,391.

Pawl, a short piece or bar moving round a pivot at one end, so as to catch in a notch or projection of a revolving body and prevent motion in one direction, as in the capstan or windlass of a ship.

Pawnbrokers, persons who lend money on goods *pledged* or deposited with them at a legally fixed rate of interest, and under the restriction of a government license. Although this mode of borrowing is occasionally taken advantage of by all classes, and bankers, when they accept security for their advances, act on the same principle as the pawnbroker, the business, as a special one, originates chiefly in the necessities of the poor. In the middle ages lending upon pledges was a trade almost exclusively pursued by Jews and Lombards. On the European continent this form of borrowing is partly conducted by charitable institutions called Monts de Piété (which see). In England pawnbrokers were recognized by statute in the reign of James I., and in 1872 an act was passed to consolidate all the acts relating to pawnbrokers in Great Britain; but it does not extend to Ireland. Every person who keeps a shop for the sale of goods, and pays or advances any sum of money upon such goods not exceeding £10, on an agreement, express or implied, that these goods or chattels may afterwards be repurchased or redeemed, shall be deemed a pawnbroker. They are required to take out a license (£7, 10*s.* per annum). Pawn-tickets are given for goods given in pledge, and the interest charged is fixed by law. On a loan under 40*s.* ½*d.* may be charged on every 2*s.* for a period not exceeding one month, and when the sum is above 40*s.* ½*d.* may be charged on every 2*s.* 6*d.* When the pawn-ticket has been lost a printed form of declaration may be got and filled up in place of it. Goods pledged and not redeemed may be sold after twelve months. Pledges for more than 10*s.* must be disposed of by public auction, subject to certain regulations. The entry of sale may be inspected within three years by the pledger in the broker's books. In the U. S. the several States have each their own laws governing pawnbroking. Pawnbrokers are taxed $20 by the Federal Govt. since July 1, 1898.

Pawtuck'et, a town of the United States, in Providence county, Rhode Island, 39 miles S.S.W. of Boston. It occupies a pleasant site; has cotton-mills, print-works, machine-shops, &c.; manufactures of boots, shoes, carriages, and an extensive trade. Pop. 1890, 27,633.

Pax, an ecclesiastical utensil in the Roman Catholic Church, formed usually of a plate of metal, chased, engraved, or inlaid with figures representing the Virgin and Child, the crucifixion, &c., which, having been kissed by the priest during the *Agnus Dei* of the high mass, is handed to the acolyte, who presents it to be kissed by each of the ecclesiastics officiating, saying to them *Pax tecum* (peace to thee). The decorations of the pax are frequently very rich.

Paxo (anciently *Paxos*), one of the Ionian Islands, belonging to Greece, 9 miles south of Corfu. It is nearly 5 miles long and 2 broad, and consists of a mass of limestone rock. Principal product, olive-oil of the finest quality. Pop. 3582.

Paxton, Sir Joseph, landscape-gardener and architect, born in Bedfordshire 1803, died 1865. He was educated at the free school of Woburn; became gardener, and latterly estate manager to the Duke of Devonshire at Chatsworth, in Derbyshire; designed the Crystal Palace for the great International Exhibition (London) in 1851, and soon after was knighted. He edited the Horticultural Register, the Magazine of Botany, the Cottage Calendar; and was the author of a Pocket Botanical Dictionary. He was elected member of parliament for Coventry in 1854, and continued to represent it until his death.

Pax-wax, the name given to the strong, stiff tendons running along the sides of the neck of a large quadruped to the middle of the back, as in an ox or horse. It diminishes the muscular effort needed to support the head in a horizontal position.

Paymaster, an officer in the army and navy, from whom the officers and men receive their wages, and who is intrusted with money for that purpose. In matters of general discipline the paymaster is subordinate to the commanding officer of his regiment; but in regard to the immediate duties of his office he is directly responsible to the war-office. The paymaster of a ship in the navy has a general charge of the financial department in the vessel.

Paymaster-general, a British government officer whose duties were formerly limited to the army, but who now acts as paymaster-general of all the services. Formerly it was a lucrative, but is now an unpaid office. The paymaster-general is *ex officio* a privy-councillor.

Payn, James, novelist, born at Cheltenham in 1830; educated at Eton, Woolwich Academy, and Trinity College, Cambridge; published two volumes of verse; contributed to the Westminster Review and Household Words; became editor of Chambers's Journal in 1858, and of the Cornhill Magazine in 1882. He has published innumerable novels, of which the following may be mentioned: Lost Sir Massingberd, A County Family, Found Dead, By Proxy, The Talk of the Town, The Luck of the Darrels, the Heir of the Ages, and a volume of Literary Recollections.

Paysandu (pī-sän-dö′), a town and port of Uruguay, on the river Uruguay, about 275 miles from Monte Video. It is famous as a centre for preparing preserved meat, especially ox-tongues. Pop. 12,000.

Pays de Vaud (pa-ē dė vō). See *Vaud.*

Paz, La. See *La Paz.*

Pea, a well-known leguminous plant of the genus *Pisum,* the *P. sativum,* of many varieties. It is a climbing annual plant, a native of the south of Europe, and has been cultivated from remote antiquity. It forms one of the most valuable of culinary vegetables; contains much farinaceous and saccharine matter, and is therefore highly nutritious. It is cultivated in the garden and in the field. Its seed-vessel is a pod containing one row of round seeds, which are at first soft and juicy, in which state they are used for the table under the name of *green peas.* They afterwards harden and become farinaceous. A whitish sort, which readily split when subjected to the action of millstones, is used in considerable quantities for soups, and especially for sea-stores. There is a blue sort which answers the same purpose.

Pea-beetle, a coleopterous insect (*Bruchus pisi*) about ¼ inch long, black, with white spots and dots on the wing-cases, very destructive to crops of pease in the south of Europe and in North America. Called also *Pea-bug, Pea-chafer,* and *Pea-weevil.*

Peabody, George, philanthropist, born at Danvers, Massachusetts, 1795; died 1869. In 1837 he came to London and established the firm of George Peabody & Co., exchange brokers and money-lenders. Having acquired a large fortune he gave $200,000 to establish a free library in his native town; presented $1,000,000 to found a free library and institute of art and science at Baltimore; and in 1862 placed $750,000 in the hands of trustees for the benefit of the poor of London, to be employed in building model dwelling-houses. He afterwards added $1,750,000 to this benefaction. In 1866 he made a gift of $2,100,000, afterward increased to $3,500,000, for the cause of education in the South.

Peabody, Essex co., Mass., is engaged largely in manuf. Pop. 1890, 10,158.

Peace, Religious, the name given in German history to a series of treaties by which, after the Reformation, the Protestant states were secured in the exercise of their religion. There were two treaties which especially bear this name, that of Nürnberg in 1532, and that of Augsburg in 1555.

Peace River, a large river of Canada, which rises in the mountains of British Columbia, flows north-eastwards, receives

the drainage of Lake Athabasca, and finally enters the Great Slave Lake under the name of the Slave River. It is 600 miles in length, and is navigable for a large part of its course.

Peach, a tree and its fruit, of the almond genus (order Rosaceæ), the *Amygdălus persica*, of many varieties. This is a delicious fruit, the produce of warm or temperate climates. The tree is of moderate stature, but varies in this respect according to soil and climate. The varieties of the fruit, which is a large downy drupe containing a stone, are very numerous, differing in size, flavour, and time of ripening, but they are principally of two sorts, the *free-stones* and the *cling-stones*, so called according as the stone separates readily or adheres to the flesh. The peach-tree is supposed to have been introduced into Europe from Persia. In the southern parts of England it is grown out of doors, and in the United States it is extensively cultivated, great quantities being canned for export. The ripe fruit is distilled and made into peach brandy. The nectarine is a smooth variety of the peach.

Peacock, called also PEAFOWL, a large and beautiful gallinaceous bird of the genus *Pavo*, properly the male of the species, the female being, for distinction's sake, called a *peahen*. The common peacock, *P. cristātus*, is a native of India and South-eastern Asia. This bird is characterized by a crest of peculiar form, and by the tail coverts of the male extending far beyond the quills, and being capable of erection into a broad and gorgeous disc. The shining, lax, and silky barbs of these feathers, and the eye-like spots which decorate their extremities, are known to every one. The colours and plumage are said to be more brilliant in the wild than in the domesticated state. The wild peahen lays from twenty-five to thirty eggs, and produces only a single brood in each year. The young birds of both sexes are feathered alike for the first two years; and in the third year the tail-coverts of the male begin to be developed and to assume their lustrous appearance. The black-shouldered or Japan peacock (*P. nigripennis*) is regarded as a variety of the common species; the Javan peacock (*P. muticus*) is a distinct form.

Peacock, THOMAS LOVE, English writer, born 1785, died 1866. His first important work was a novel entitled Headlong Hall, published in 1815, and this was followed by Melincourt, Nightmare Abbey, Maid Marian, the Misfortunes of Elphin, Crotchet Castle, Gryll Grange, and a poem called Rhododaphne. He was the friend and executor of Shelley, and was connected with the East India Office for nearly forty years.

Peacock-butterfly, a name given by collectors of insects to butterflies of the species *Vanessa Io*, from the eyes on their wings resembling the eyes on peacocks' feathers.

Peacock-fish, a fish of the Mediterranean and Indian Seas (*Crenilabrus pavo*), characterized by the brilliancy of its hues—green, yellow, and red.

Pea-crab, a small brachyurous crustacean of the genus *Pinnothēres*, which lives in the shells of oysters, mussels, and other bivalves. Two or three species are met with in this country.

Peak, or HIGH PEAK, a district of England, forming the north-west angle of Derbyshire, and consisting of a wild and romantic tract, full of hills, valleys, and moors, and celebrated for its limestone caverns and grottoes.

Peale, REMBRANDT, artist, was born in Bucks co., Penna., in 1778. When 17 years old executed a portrait of Washington, from whom he had three sittings. He painted portraits of many distinguished men. He was President of the American Academy, and also one of the original members of the Academy of Design. His portrait of Washington (1823) was purchased by Congress. He died in 1860.

Pea-maggot, the caterpillar of a small moth which lays its eggs in peas.

Pea-nut. Same as *ground-nut*.

Pear, a tree of the genus *Pyrus*, order Rosaceæ, the *P. commūnis*, growing wild in many parts of Europe and Asia, and from which the numerous cultivated varieties have originated. The fruit is characterized by a saccharine aromatic juice, a soft and pearly liquid pulp, melting in the mouth, as in the butter-pear; or by a firm and crisp consistence, as in the winter bergamots. The pear is chiefly propagated by grafting or budding on the wild pear stock, or on stocks raised from the seeds of cultivated pears, called free stocks. It is also grafted on the quince, the medlar, and the white thorn. At the present day more than 200 varieties are enumerated, and constant accessions are made every year. France and the north of Italy are celebrated for the perfection to which they have carried the culture of this fruit. Numerous varieties are cultivated solely for the purpose of making

perry, a liquor analogous to cider, and prepared nearly in the same manner. The wood is fine-grained, of a yellowish colour, and susceptible of a brilliant polish. In the early ages of Greece it was employed in statuary; now it is used for musical instruments, the handles of carpenters' tools, in wood-engraving, &c.

Pearl, the name applied to a concretion produced within the shells of certain species of bivalve molluscs as the result of some abnormal secretory process. These concretions are highly valued, and are classed among the gems. The production of a pearl is generally begun by the introduction of some foreign body, such as a grain of sand, within the mantle-lobes. The presence of this body has the effect of setting up an irritant action, resulting in the deposition by the mantle of a quantity of nacreous material over the offending particle. This material, in certain species of molluscs, is of such a texture and character, and is so deposited in regular laminæ or layers, that in due time the structure known as a 'pearl,' varying in worth and brilliancy, is formed. Chief amongst such molluscs are the pearl-oyster (*Meleagrina margaritifĕra*), the pearl-mussel (*Avicŭla margaritifĕra*), and the fresh-water mussels (genus *Unio*) of British rivers.

The chief pearl-oyster fisheries are those of Ceylon, which, together with the fisheries in the Persian Gulf, were known to the ancients. The chief seat of the Ceylon fishery is in the Gulf of Manaar, on the north-east of the island. It begins in February or March, and extends over a period of about a month, a large fleet of boats being usually engaged in it. The average depth at which the oysters are found varies from 60 to 70 feet, and the divers are let down by a stout rope weighted by a heavy stone. Having gathered a number of the oysters into a net, at the end of half a minute or so the diver is pulled up. The oysters being carried to shore, and laid in piles, in about ten days become thoroughly decomposed. They are then thrown into sea-water, and carefully examined for pearls; whilst the shells, after being cleaned, are split into layers for the sake of the mother-of-pearl. The pearl-fisheries of Ceylon are a government monopoly, but the revenue derived from them is not a regular one, the fishery sometimes failing for years in succession. There was no fishery, for example, between 1837 and 1854, or between 1863 and 1874. The best pearls are found about Ceylon, Persia, and other eastern coasts, and inferior ones on the tropical coasts of America. The pearl-oyster occurs throughout the Pacific. Very fine pearls are obtained from the Sulu Archipelago on the north-east of Borneo. Of late years pearl-fishing has been started with considerable success in Australian seas; and it is carried on also in the Gulf of Mexico, upon the coast of California, and in the vicinity of Panamá.

Pearls have also been obtained from the fresh-water mussels of British streams, and Scotch pearls were famed even in the middle ages. The Scotch pearl-fishery, after being abandoned for years, was revived in 1860, and in 1865 the produce of the season's fishing in the Scotch rivers was worth at least £12,000. The yield, however, has not been maintained. Many rivers of Ireland and Wales furnish pearls. The pearl-fisheries of Britain are now, however, practically neglected, but river-pearls are systematically sought for in Germany, in the United States, and especially in China.

Pearls have formed valued articles of decoration and ornament from the earliest times. Julius Cæsar presented Servilia, the mother of Marcus Brutus, with a pearl valued in modern computation at £48,000; while Cleopatra was said to have swallowed one gem valued at £60,000 or £80,000. A pearl purchased by the traveller Tavernier is alleged to have been sold by him to the Shah of Persia for £180,000. The 'Pilgrim' pearl of Moscow is diaphanous in character, and weighs 24 carats.

Artificial pearls are largely made in France, Germany, and Italy. They are very well imitated by the scales of certain fishes. A substitute for black pearls is found in close-grained hæmatite, not too highly polished, and pink pearls are imitated by turning small spheres out of the rosy part of the conch-shell.

Pearl, Mother of. See *Mother-of-pearl.*

Pearl-ash, the common name for carbonate of potassium. See *Potash.*

Pearl Barley. See *Barley.*

Pearl Moss, the same as *Carrageen* (which see).

Pearl Powder. See *Bismuth.*

Pearl Stone, a felspathic mineral, consisting of silicate of aluminium with varying quantities of iron, lime, and alkalies; it occurs in spherules, which have a pearly lustre.

Pearly Nautilus, a name for the common nautilus. See *Nautilus.*

Pearson, John, English prelate, born at Snoring, Norfolk, about 1613, died 1688; educated at Eton and Cambridge. He took orders in 1639, and held successively the livings of Torrington in Suffolk, and of St. Clement Eastcheap, London. He became professor of divinity at Cambridge in 1661, and Bishop of Chester in 1672, and was considered one of the most learned Englishmen of his time. His chief work is an Exposition of the Creed (1659).

Peary, Robert E., Arctic explorer, born at Cresson Springs, Pa., May 6, 1856; educated at Bowdoin College; entered civil engineer corps U. S. Navy 1881. In 1886, with one companion, he penetrated the Greenland ice-cap for 100 miles in lat. 69° 30′ N. In 1891, with a party of six, he went to N. W. Greenland to study the Eskimos, he discovered Independence Bay, after a brilliant sledge journey of 1300 miles, on the N. E. coast, lat. 81° 37′ N. He proved the supposed northern part of Greenland to be an island. He again reached Independence Bay in 1895, but supplies falling short he was unable to explore the archipelago to the N. He made another venture 1896, and on July 2, 1898, with only one white man, essayed another tour; this time to attempt the discovery of the North Pole.

Peasant Proprietors, the owners of relatively small estates of land which they cultivate themselves; the term deriving its specific meaning and importance from the theories of a class of economists represented on the European Continent by Sismondi, and in Britain by John Stuart Mill. See *Land*.

Peasants' War, a great insurrectionary movement among the German peasantry, which in 1525 spread over the whole of Germany. The immediate cause of this movement was religious fanaticism, but the pent-up forces by which it was impelled grew out of the long course of oppression to which feudal customs and priestly tyranny had subjected the people. Before the Reformation, particularly from 1476 to 1517, a series of popular commotions and insurrections had broken out in various parts of Southern Germany, without procuring any relaxation of burdens. The Reformation gave hopes of relief, and though Luther and Melanchthon opposed the idea of carrying out a religious and a social revolution simultaneously, a general ferment among the peasantry came to a head on Jan. 1, 1525, with the capture of the convent of Kempten (Bavaria). A general unorganized rising of the German peasantry followed, fearful excesses and atrocious cruelties were committed, but in a few months the mobs were dispersed or massacred by the soldiery of the nobles. It is estimated that 150,000 persons lost their lives in these risings, which for the time gave a severe blow to the Reformation. See also *Anabaptists; Jacquerie*.

Pea-stone, or **Pisolite**, a limestone rock, composed of globules of limestone about the size of a pea, usually formed round a minute grain of sand or other foreign body, and joined with a cement of lime. In pisolitic rocks belonging to the Oolitic period ironstone is frequently found.

Peat, a kind of turfy substance consisting of vegetable matter which has accumulated by constant growth and decay in hollows or moist situations on land not in a state of cultivation, always more or less saturated with water, and consisting of the remains, more or less decomposed, of mosses and other marsh plants. Peat is generally of a black or dark-brown colour, or when recently formed, of a yellowish-brown; it is soft and of a viscid consistence, but it becomes hard and darker by exposure to the air. When thoroughly dried it burns, giving out a gentle heat without much smoke; accordingly it is used as fuel.

Pea-weevil. See *Pea-beetle*.

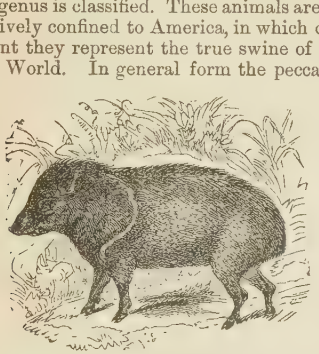
Peba, a species of the armadillo (*Tatusia septemcinctus*) found in various parts of South America. Its flesh is much valued by the natives.

Pebble, in jewelry, a name commonly given to an agate. Scotch agates are commonly known as *Scotch pebbles*.

Pébrine, a French name for a destructive epizoötic disease among silkworms due to internal parasites, which swarm in the blood and all the tissues of the body, passing into the undeveloped eggs of the females, so that it is hereditary, but only on the side of the mother. It is contagious and infectious, the parasitic corpuscles passing from the bodies of the diseased caterpillars into the alimentary canal of healthy silkworms in their neighbourhood.

Pecan', **Pecan-nut**, a species of hickory (*Carya olivæformis*) and its fruit, growing in North America. It is a large tree, with hard, very tough wood, pinnate leaves, and catkins of small flowers. The nuts are occasionally to be met with in British fruit-shops.

Pec'cary (*Dicotyles*), a genus of Ungulate quadrupeds, included in the Artiodactyle ('even-toed') section of that order, and nearly allied to the swine, in which family (Suidæ) the genus is classified. These animals are exclusively confined to America, in which continent they represent the true swine of the Old World. In general form the peccaries



Collared Peccary (*Dicotyles torquātus*).

resemble small pigs. The best-known species are the collared peccary (*Dicotyles torquātus*) and the white-lipped peccary (*D. labiātus*). The former occurs abundantly in South America, and also extends into North America, living generally in small flocks, which do not hesitate to attack with their tusks any one who meddles with them. Their food consists of maize, potatoes, sugar-canes, and similar materials; and cultivated fields suffer much from their raids. This species of peccary is readily domesticated. The flesh is savoury, and less fat than pigs' flesh. The peccary possesses a glandular sac or pouch, situated in the loins, which secretes a strongly-smelling fluid of fœtid nature. This must be cut away immediately on killing a peccary, to avoid contaminating the flesh.

Pe-chi-le. See *Chih-le.*

Peck, the fourth part of a bushel; a dry measure of 8 quarts for grain, pulse, &c. The standard or imperial peck contains 2 gallons or 554·548 cubic inches.

Pecop'teris, the name given to a genus of fossil ferns occurring in the Coal-measures, New Red Sandstone, and Oolite, from the comb-like arrangement of its leaflets.

Pecos River, a river of New Mexico and Texas, which has a south-easterly course of about 800 miles, and falls into the Rio Grande del Norte, but in summer is generally dry.

Pecquet (pek-ā), JEAN, born at Dieppe about 1620, died 1674; studied medicine, and especially anatomy, at Montpellier. He discovered and demonstrated the course of the lacteal vessels in the human body.

Pecten, a genus of Lamellibranchiate Mollusca, included in the oyster family (Ostræidæ), and popularly designated under the name of 'scallop-shells.' Numerous species of pecten—180 or more—are known. The common pecten (*P. operculāris*) and the frill or great scallop (*P. maximus*) are the most common forms. The latter form is esteemed a delicacy, and as such is sold in the London markets. The shell of this species was borne in the middle ages by pilgrims in their hats, as a sign that they had visited the Holy Land. The shell is somewhat rounded, and terminates superiorly in a triangular 'ear,' in which the hinge exists. The name 'pecten' (Latin for 'comb') is derived from the indentation of the edges and surfaces of the shell.

Pectinibranchiata, those gasteropods having pectinated branchiæ or gills, as the purple shells (*Murex*), whelk (*Buccīnum*), cowries (*Cyprœa*), &c.

Pec'tolite, a mineral consisting of a silicate of lime and soda. It is a tough grayish or whitish mineral occurring in trap-rocks, in aggregated crystals of a silky lustre, arranged in sparlike or radiated forms. Called also *Stellite.*

Peculiar, in canon law, a particular parish or church which has jurisdiction within itself, and exemption from that of the ordinary or bishop's court. The *Court of Peculiars,* in England, is a branch of the Court of Arches which has jurisdiction over all the parishes in the province of Canterbury which are exempt from the ordinary jurisdiction, and subject to the metropolitan only.

Peculiar People, a small sect of religionists whose special doctrine seems to be the efficiency of prayer without the use of any efforts on their own part. In sickness they reject the aid of physicians, accepting Jam. v. 14, 15 in a strictly literal sense. They are called also *Plumstead Peculiars,* from the place of their origin.

Peculium, private property; specifically, in Roman law, that which was given by a father or master to his son, daughter, or slave, as his or her private property.

Ped'als, parts of the mechanism of a musical instrument acted on by the feet. Pedals are used for different purposes in different instruments. In the organ they are used in two distinct ways: first, to act on the swell and stops when the instrument is

played with the hands; second, to act upon a distinct set of pipes, called the pedal organ, and which are played independently. On the pianoforte there was at first only one pedal, used to raise the dampers and prolong the sound after the fingers were lifted from the keys; a second was used to soften the notes, and is called the soft or una-corda pedal; a third has of late years been introduced, which arrests the sound immediately after the note is struck, and produces an artificial staccato. In the harmonium the pedals supply the instrument with wind.

Pedee', Great and Little, two rivers in the United States. The former rises in North Carolina, enters South Carolina, and falls into the Atlantic; total course, 360 miles, of which 200 miles are navigable for boats of 60 or 70 tons. Little Pedee rises in North Carolina, and enters the Great Pedee 32 miles above its embouchure.

Ped'estal, an insulated basement or support for a column, a statue, or a vase. It usually consists of a base, a dado, and a cornice. When a range of columns is supported on a continuous pedestal the latter is called a *stylobate*.

Pede'tes (Gr. *pēdētēs*, a leaper), a genus of rodent mammals, of the mouse family, of which the best-known species is *P. capensis* (the jumping-hare of South Africa).

Ped'icel, in botany, the stalk that supports one flower only when there are several on a peduncle. Any short and small footstalk, although it does not stand upon another footstalk, is likewise called a pedicel.

Pedicella'riæ, certain minute organisms or structures found attached to the skin or outer surface of star-fishes, sea-urchins, and other Echinodermata. Each pedicellaria consists essentially of a stalk attached to the organism, and bearing at its free extremity two or more movable blades or jaws, which close and open on foreign particles so as to retain them. The exact nature of these structures is still a matter of doubt.

Pedic'ulus. See *Louse*.

Ped'igree. See *Genealogy*.

Pedilan'thus, a genus of South American plants belonging to the nat. order Euphorbiaceæ, of which one species (*P. tithymaloides*), used medicinally in the West Indies, is known under the name of ipecacuanha, and is employed for the same purpose as that drug.

Ped'iment, in classic architecture, the triangular mass resembling a gable, above the entablature at the end of buildings or over porticoes. The pediment is surrounded by a cornice, and is often ornamented with sculpture. The triangular finishings over doors and windows are also called pediments. In the debased Roman style the same name is given to these same parts, though not triangular in their form. In the architecture of the middle ages small gables and triangular decorations over openings, niches, &c., are called pediments.

Pedipalpi, an order of arachnidans, comprising the scorpions, with certain other animals.

Pedlars and Hawkers are itinerant dealers who carry their goods from place to place for sale. The Hawkers' Act (1888) defines a hawker as one who travels with a horse or other beast bearing or drawing a burden; the Pedlars' Act (1871) describes a pedlar as one travelling without a horse, &c. Certificates for the latter (5*s.* annually) are given by the chief officer of police of the district for which they are asked, to persons of good character, who must satisfy the officer they are seventeen years of age, have resided for one month in the district, and intend to carry on the business of a pedlar in good faith. Hawkers' licenses are granted by the excise, and cost £2 annually. In the United States hawkers are denominated hucksters, and, with pedlars, are regulated by license in most cities.

Pedom'eter is an instrument like a watch, which serves to indicate the distance a pedestrian traveller has gone, or rather the number of paces he has made. See *Hodometer*.

Pedro II., ex-Emperor of Brazil, was born at Rio Janeiro 1825; succeeded to the throne on the abdication of his father, Dom Pedro I., in 1831; and married the Princess Theresa Christina Maria (died 1890), sister of Francis I., king of Naples, in 1843. Brazil has prospered greatly under the rule of Pedro II., who has done much to develop its resources in every direction. In 1871 he issued an imperial decree for the gradual abolition of slavery, which totally ceased in Brazil in May, 1888. He made several visits to Europe, and was deposed by the revolution of Nov. 1889. Died in 1891.

Pedun'cle, in botany, the stem or stalk that supports the fructification of a plant, *i.e.* the flower and the fruit.

Peebles, or Tweeddale, an inland county in Scotland, between Dumfries, Selkirk,

Edinburgh, and Lanark; area, 226,899 acres, of which about one-eighth is arable. The greater part of the surface consists of mountain, moor, and bog, and the main industry is sheep-farming. Highest summit, Broad Law, 2723 feet, near the south border. White and red freestone are common in the northern part of the county, and both coal and limestone have been wrought at various points. The Tweed is the only river of any note, but there are numerous rivulets, tributaries of the Tweed. Most of these abound in salmon and trout. The county, in conjunction with Selkirk, returns a member to parliament. Pop. 14,760.—PEEBLES, a royal burgh, capital of the above county, on the Tweed, is a favourite summer resort. The manufacture of tweeds and other woollen stuffs is carried on. The Chambers Institution, presented to his birthplace in 1859 by Dr. W. Chambers, the well-known publisher, comprises a reading-room, a public library of 20,000 volumes, a museum, a gallery of art, and a hall for lectures and concerts. Peebles was made a royal burgh in 1367. Pop. 3495.

Peechi. See *Dauw.*

Peekskill, an industrial town of the United States, state of New York, on Hudson River, 43 miles north of New York City. Pop. 1890, 9676.

Peel, a seaport town on the west coast of the Isle of Man, of some note as a health resort and a fishing station. On St. Patrick's Isle, joined to the mainland by a causeway, are the ruins of St. German's Cathedral and of Peel Castle. About 3 miles to the south-east is Tynwald Hill, celebrated in connection with the passing of the Manx laws. Pop. 4360.

Peel, RIGHT HON. ARTHUR WELLESLEY, youngest son of Sir Robert Peel, born 1829. He was educated at Eton and Oxford; entered parliament as member for Warwick and Leamington in 1865; was parliamentary secretary to the Poor-law Board (1868–71); secretary to the Board of Trade (1871–73); patronage secretary to the treasury (1873–74); under-secretary for the Home Department (1880); and on the retirement of Sir Henry Brand (Viscount Hampden) in 1884, became speaker of the House of Commons.

Peel, SIR ROBERT, British statesman, was born 5th February, 1788, near Bury in Lancashire. His father, who had raised himself from a comparatively humble station to be the largest cotton manufacturer in the world, was created a baronet in 1800, and left behind him a fortune of nearly £2,000,000, of which the largest share was inherited by his eldest son Robert. Young Peel was sent to Harrow and Oxford, where he took his bachelor's degree in 1808, with double first-class honours. Immediately on

Sir Robert Peel.

attaining his majority he was elected member of parliament for Cashel; in 1810 he became under-secretary of state for the colonies, and in 1812–18 he was chief secretary for Ireland. In 1817 he was elected representative of the University of Oxford. The following year he resigned his office in the ministry, of which he still continued to be a supporter, and began to take a leading part in the discussion of the difficult financial questions then pending. In 1822, under the Liverpool ministry, he became home secretary, and continued in this office till the dissolution. Refusing to take office under Canning, he joined the ministry of the Duke of Wellington in 1828 as home secretary. The principal act of this ministry was the passing of the Roman Catholic relief bill, which cost Peel his seat for Oxford. Peel also passed the New Metropolitan Police Act, which gave rise to the new nicknames Bobbies and Peelers for the London police. In 1830 he succeeded his father as baronet. At the close of this year the ministry resigned in consequence of the increasing agitation for parliamentary reform, and were succeeded by the reform ministry of Earl Grey. Peel strenuously opposed the bill, but after it became law he declared his intention frankly to accept it, and

began vigorously to prepare his party for the change in its circumstances. In the election of 1832 he was returned for Tamworth, for which he continued to sit during the remainder of his life. On the dismissal of the Whig government in 1834 Peel undertook the government, but his party in the house being in a minority the task was hopeless. After a brief struggle the ministry resigned, and were succeeded by the Whig ministry of Lord Melbourne, which lasted from 1835 to 1841. The general election of 1841 gave a large majority to Sir Robert Peel, and the formation of a Conservative ministry could no longer be delayed. In the session of 1842 the most important measures were the sliding-scale, by which a considerable reduction was made on the duties on the importation of corn (see *Corn-laws*); the imposition of an income-tax for three years, but which with various alterations has continued to be levied to the present time (see *Income-tax*); and a revision of the tariff. In 1844 and 1845 he passed his celebrated English and Scotch Banking Acts. During the recess in 1845 the potato-rot and famine in Ireland brought the question of the corn-laws to a crisis, and Peel declared in favour of their total repeal. The act repealing the corn-laws (after a modified duty for three years) was passed 26th June, 1846. On the same day the ministry was defeated in the House of Commons on the Irish Coercion Bill, and on the 29th of June Sir Robert Peel resigned. As leader of the opposition he supported many of the measures of the government of Lord John Russell, who succeeded him; but the policy of Lord Palmerston after the revolution crisis of 1848–49 evoked from him a more active hostility to the ministry. On 29th June, 1850, he was thrown from his horse, and received injuries of which he died on 2d July. By his will he renounced a peerage for his family, as he had before declined the Garter for himself.

Peele, GEORGE, one of the poets of Shakspere's time, was born in Devonshire about 1558, and educated at Oxford, where he made a great reputation. Ultimately he settled at London as a theatrical writer, and was the associate of Nash, Marlowe, and Greene. Of the many dramas of which he was reputed to be the author only a few are certainly known to be his, among these few being The Chronicle History of Edward I. He died in 1598.

Peel-tower, or simply PEEL, the name given on the Scottish borders to small residential towers erected for defence against predatory excursions. They were usually square buildings with turrets at the angles. The lower part was vaulted, and served for the accommodation of horses and cattle.

Peep-o'-day Boys, the name given to those insurgents who appeared in Ireland in 1784, shortly after the volunteer movement. They were so named from visiting the houses of the 'defenders,' their antagonists, at daybreak in search of arms.

Peepul, PIPUL, or SACRED FIG (*Ficus religiosa*), a species of fig-tree common in India, and held sacred by the Hindus and Buddhists. Its leaves are heart-shaped on long stalks. It attains a great age, and is usually planted near temples, where it affords shelter to the devotees. Vishnu is said to have been born under a peepul-tree. Its fruits are edible, but not much esteemed.

Peer (French, *pair*, from Latin *par*, equal), in general, signifies an equal, one of the same rank and station. In this sense it is used by the common law of England, which declares that every person is to be tried by his peers. Peer also signifies in Britain a member of one of the five degrees of nobility that constitute the *peerage* (duke, marquis, earl, viscount, baron), or more strictly a member of the House of Lords. The dignity and privileges of peers originated with the growth of the feudal system, the peers being originally the chief vassals holding fiefs directly from the crown, and having, in virtue of their position, the hereditary right of acting as royal counsellors. Subsequently not all the crown vassals appeared at court as advisers of the king, but only those who were summoned to appear by writ. This custom grew at length into a rule, and these summonses were considered proofs of hereditary peerage. Latterly the honour of the peerage has been exclusively conferred by patent. As regards their privileges all peers are on a perfect equality. The chief privileges are those of a seat in the House of Lords, of a trial by persons of noble birth in case of indictments for treason and felony, and misprision thereof, and of exemption from arrest in civil cases. The British peerage collectively consist of peers of England, of Scotland, of Great Britain, of Ireland, and of the United Kingdom, but only a portion of the Scotch and Irish peers are peers of parliament.

Peffer, WILLIAM A., U. S. Senator, was born in Cumberland co., Pa., Sept. 10,

1831. An exponent of the ideas advocated by the Farmers' Alliance. He was elected U. S. Senator from Kansas for term beginning March 4, 1891.

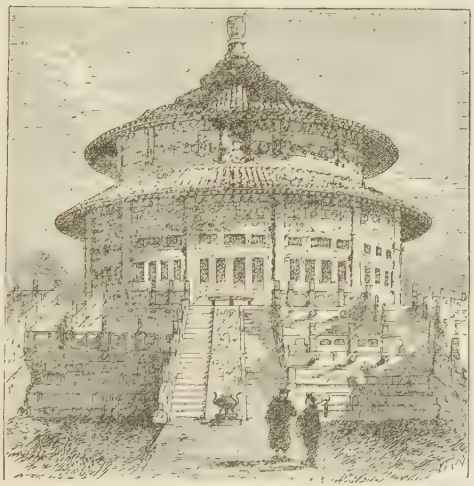
Peg'asus, in Greek mythology, a winged horse, the offspring of Poseidon and Medusa. Bellerophon made use of Pegasus in his fight with the Chimæra. (See *Bellerophon.*) With the stroke of his hoof Bellerophon called forth the sacred well Hippocrene, on Mount Helicon, from which he was in later times called the horse of the muses.

Peg'asus, a genus of acanthopterous fishes allied to the gurnets. *P. draco,* or sea-dragon, inhabits the Indian seas.

Peg'matite, a coarse granite rock, composed mainly of felspar and quartz, used in the manufacture of porcelain.

Pegu (pe'gö), now a division of Lower Burmah, but previous to 1757 a powerful and independent kingdom, and from that period up to 1853 a province of the Burmese Empire, from which it was severed and annexed to the British dominions in 1853. The province comprised the whole delta of the Irrawady; area, 25,964 square miles; pop. 2,323,512. The modern division of Pegu lies mainly on the east of the lower Irrawady; area, 9159 sq. miles; cultivated area, 2043 sq. miles; pop. 1,162,393. Chief town, Rangoon.

Pegu, an ancient city in the Pegu division of Lower Burmah, on the left bank of the Pegu River, about 70 miles north from Rangoon. Founded in the 6th century A.D., and long the capital of the kingdom of the same name, it was formerly a place of great size, strength, and importance, but was destroyed in 1757 by the Burmese. A new town has been built on the site of the old. Pop. 5891.



Temple of Heaven, Peking.

Pehlvi, or PEHLEVI. See *Persia—Language.*

Pei-ho (pe-i-hō'), a river of Northern China, rises near the Great Wall, and flows south-east to the Gulf of Pechelee. It is navigable for boats to within 20 miles of Peking, which it passes at the distance of about 10 miles. At its mouth is the small town of Taku, with several forts, which acquired some note in the war with the British and French in 1860.

Peine Forte et Dure (pen fort e dür), a punishment formerly inflicted upon a prisoner who refused to plead guilty or not guilty when put on trial for felony. He was put into a low dark chamber, and laid on his back naked, on the floor. As great a weight of iron as he could bear was then laid upon him, and in this situation bread and water was alternately his daily diet till he died or answered.

Peipus (pe'i-pus), a lake of Russia, between the governments of St. Petersburg, Revel, and Livonia; length, 55 miles; breadth, 30 miles. It discharges itself by the Narova into the Gulf of Finland. It is well supplied with fish.

Peishwa, or PESHWA, the prime-minister and subsequently the head of the Mahratta Empire or Confederacy. See *Mahrattas.*

Pekan', a species of marten (*Mustēla pennanti*) nearly allied to the sable, found in woody regions of North America.

Pekin, Tazewell co., Ill., a railroad centre, has important manufacturing and extensive pork-packing establishments. Pop. 1890, 6347.

Peking', or PEKIN' ('northern capital' as opposed to Nanking), the capital of the Chinese Empire, in the province of Chih-le or Pechelee, on an extensive, barren, sandy plain,

between the rivers Pei-ho and Hoen-ho, about 40 miles from the Great Wall, and 100 miles from the Gulf of Pechelee. The entire circuit of the walls and suburbs of Peking is reckoned at 30 miles. There are in all sixteen gates leading into the city, each protected by a semicircular enceinte, and a higher tower built in galleries. The city consists of two portions, the north or Tartar city, and the south or Chinese city. The former is built in the shape of a parallelogram, and consists of three inclosures, one within the other, each surrounded by its own wall. The innermost inclosure ('the forbidden city') contains the imperial palace, and buildings connected with it, in which the emperor and royal family reside. The second inclosure ('the imperial city') is the residence of the imperial princes and officials of the highest rank. The outer or Tartar city proper is the seat of the six supreme tribunals, and contains the legations of Great Britain, France, the United States, and Russia. In the Chinese city broad straight streets run from gate to gate, intersecting each other at right angles, but they are unpaved, and in rainy weather impassable from mud. Amongst the principal public buildings of Peking are the Temple of Eternal Peace, belonging to the lamas; the Mohammedan mosque; the observatory; the Temple of Agriculture and the Temple of Heaven. In the latter temple the emperor periodically offers sacrifice. It is a vast circular building surmounted by a couple of inverted saucer-shaped roofs, one over the other, and the exterior is brilliantly and harmoniously coloured. It occupies a commanding position, and is approached from the different sides by magnificent alabaster stairs. There are religious edifices appropriated to many forms of religion, the principle of toleration being here carried to the utmost extremity—amongst these are the Greek and Latin churches, Moslem mosques, Buddhist temples, besides temples dedicated to Confucius and other deified mortals. Among the institutions of Peking are the national college, the medical college, astronomical board, and the imperial observatory. Peking is sustained solely by its being the seat of government, having no trade except that which is produced by the wants of its population. Peking is regarded by the Chinese as one of their most ancient cities, but it was not made the capital of the country until its conquest by the Mongols about 1282. In the war of 1860 Peking was occupied by the British and French on 12th October, and evacuated by them, after the signing of a convention, on 5th November. Pop. variously estimated at from 500,000 to 1,650,000.

Pela'gianism, the system of opinions identified with the name of Pelagius (which see). They included a denial of original sin or the taint of Adam; the maintenance of the doctrine of free-will and the merit of good works, and of the power in man to receive or reject the gospel. The promulgation of his views by Pelagius was nearly simultaneous with that of the orthodox theory of original sin, &c., by Augustine, and in the development of his doctrine Augustine was influenced by his opposition to Pelagianism. Among the early supporters of Pelagius was Cœlestius, a Roman advocate, who afterwards became a monk; and it was the application of Cœlestius for ordination as a presbyter at Carthage which led to the open conflict between the two schools of thought. His application was denied on the ground of seven heretical opinions, and he was condemned and excommunicated by the Council of Carthage held in 412 A.D. In 417 and 418 A.D. the Council of Carthage repeated its condemnation, and the Emperor Honorius issued a rescript against the Pelagian doctrines. The pope then confirmed the sentence of the councils, and anathematized the Pelagians. In the East, Pelagianism was officially condemned by the Council of Ephesus in 431 A.D. A doctrine subsequently distinguished as *semi-pelagianism* was taught by John Cassian, a monk of Constantinople, ordained a deacon by Chrysostom in 403.

Pelagic Sealing, the killing of seals on the waters of the ocean. In 1898 an effort was made to prevent this; the U. States, Russia and Japan assenting—Gt. Britain, at the instance of Canada, refusing.

Pela'gius, the author of the system of doctrine which goes by his name (see above article), was understood by his contemporaries to be of British birth, and the name is supposed to be a Græcized form of the Cymric Morgan (sea-begotten). He was not a monk, but he adhered to monastic discipline, and distinguished himself by his sanctity and purity of life. He came to Rome in the beginning of the 5th century, and is there said to have learned the opinions afterwards identified with his name from a monk Ruffinus, whose teaching was founded on that of Origen. In 410 A.D., during

Alaric's third siege of the city, he escaped with his convert and pupil, Cœlestius, to Northern Africa, and had gone from there to Palestine before the meeting of the Council of Carthage (411–12) which condemned Cœlestius. In Palestine he lived unmolested and revered until 415, when Orosius, a Spanish priest, came from Augustine to warn Jerome against him. The result was that he was prosecuted for heresy, but two councils (at Jerusalem, and at Diospolis, the ancient Lydda) pronounced him orthodox. He was subsequently expelled from Jerusalem, however, in consequence of condemnations by the Council of Carthage in 417 and 418 A.D., and by a synod held at Antioch in 421 A.D. Nothing is known of his subsequent career.

Pel'amis, a genus of venomous sea-snakes, often found swimming in the ocean at great distances from land. It has a length of 2½ feet, and is black above and yellow beneath.

Pel'amys, a genus of fishes, belonging to the mackerel family.

Pelargonium. See *Geranium.*

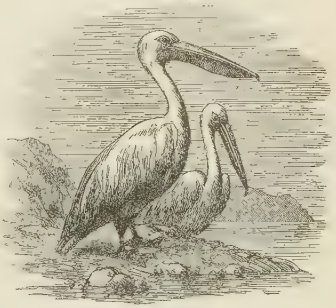
Pelas'gians, a prehistoric race widely spread over the whole of Greece, the coasts and islands of the Ægean, and also in Asia Minor and Italy. Niebuhr regarded them as a great and widely-spread people, inhabiting all the countries from the Po to the Bosporus, and supplying a common foundation to the Greek and Latin peoples and languages. Other writers, such as Grote, receive the entire tradition of the Pelasgians with almost complete scepticism. A common view is that they were simply the earliest Hellenic inhabitants of Greece. Various monuments have been attributed to the Pelasgi, both in Greece and in Italy, but in regard to these there is the same sort of uncertainty as in regard to the people themselves. These remains belong to the style of architecture called Cyclopean. See *Cyclopean.*

Peleus (pē'lūs), in Greek mythology, son of Æăcus, king of Ægina. After many adventures he became master of a part of Thessaly, and married the nymph Thetis, by whom he became the father of Achilles. The nuptials were celebrated on Mount Pelion, and honoured with the presence of all the gods, who brought rich bridal presents. After his death he received divine honours.

Pelew' Islands, a group belonging to the Caroline Archipelago, in the North Pacific Ocean. They are about twenty in number, extend nearly N.N.E. and S.S.W. 87 miles, and are completely encircled by reefs. They are fertile, and enjoy a good climate. The inhabitants are Polynesians, and have generally got a high character from visitors. Pop. 6000.

Pe'lias, a genus of serpents, including the common viper or adder (*P. berus*).

Pel'ican, the name of several web-footed birds of the genus *Pelecānus.* They are larger than the swan, have a great extent of wing, and are excellent swimmers. Pelicans are gregarious, and frequent the neighbourhood of rivers, lakes, and the sea-coast,



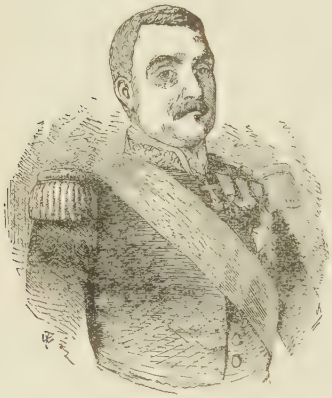
Pelican (*Pelecānus onocrotălus*).

feeding chiefly on fish, which they capture with great adroitness. They have a large flattened bill, the upper mandible terminated by a strong hook, which curves over the tip of the lower one; beneath the lower mandible, which is composed of two flexible, bony branches meeting at the tip, a great pouch of naked skin is appended, capable of holding a considerable number of fish, and thus enabling the bird to dispose of the superfluous quantity which may be taken during fishing expeditions, either for its own consumption or for the nourishment of its young. The species are found in Europe, Asia, Africa, and America. They sometimes perch upon trees; the nest is of rough construction, usually placed close to the water. The common or white pelican (*P. onocrotălus*) is coloured a delicate white, tinged with rose or pink. The young birds are fed by the parents with fishes from the pouch, and the males are said to feed the incubating females in a similar manner. The common pelican inhabits Europe, Asia, and Africa. About the middle of September flocks repair to Egypt. During the summer months they take up their abode on the borders of the

Black Sea and the shores of Greece. They are rare in France and unknown in Britain. The pelican is not only susceptible of domestication, but may even be trained to fish for its master.

Pe'lion, a mountain of Greece, in Thessaly, near the sea, 5300 feet high. In the war of the Titans with the gods the former, say the poets, piled Ossa upon Pelion to aid them in climbing to Olympus.

Pélissier (pā-lēs-yā), Jean Jacques Amable, Duc de Malakoff, Marshal of France, was born in 1794, died in Algeria 1864. He was educated at the school of St. Cyr, and in 1815 entered the army as sub-lieutenant



Marshal Pélissier.

of artillery, subsequently serving in Spain in 1823, in the Morea in 1828–29, and in Algeria. In this country, being now a colonel, in 1845 he suffocated in a cave a party of Arabs who had taken refuge in it, by lighting a fire at the mouth, an atrocity which brought great odium on his name. In 1855 he replaced Canrobert as commander-in-chief of the French army in the Crimea; and by the vigour with which he pushed the siege he justified the expectations which had been formed of him. On the capture of the Malakoff and the fall of Sebastopol Pélissier received his marshal's baton, and an annual pension of 100,000 francs. He was afterwards vice-president of the senate, a privy-councillor, and ambassador to England (1858). In 1860 he was appointed Governor-general of Algeria.

Pella, the ancient capital of Macedonia, and the birthplace of Alexander the Great. It surrendered to Paulus Æmilius 168 B.C., and from a large and magnificent city it sunk, under the Romans, to a mere station.

Pellag'ra, an endemic disease of comparatively modern origin occurring especially in the plains of North Italy. It begins by an erysipelatous eruption on the skin, which breaks out in the spring, continues till the autumn, and disappears in the winter, chiefly affecting those parts of the surface which are habitually exposed to the sun or air, is accompanied or preceded by remarkable lassitude, melancholy, moroseness, hypochondriasis, and not seldom a strong propensity to suicide. With each year the disorder becomes more aggravated, with shorter intervals in the winter. At length the surface becomes permanently enveloped in a thick, livid crust, and the patient ceases at last to exist and to suffer when reduced to the state and appearance of a mummy. The disease is almost confined to those who reside in the country, leading an agricultural life, and to the lowest orders of society. The general opinion is that the pellagra results from the extreme poverty and low unwholesome diet of the peasantry.

Pellew, Edward. See *Exmouth*.

Pel'lico, Silvio, Italian poet, born 1788 at Saluzzo, in Piedmont. By his tragedies of Laodamia and Francesca da Rimini (represented in 1819, with great applause) he earned an honourable place among Italian poets. In the same year, with Manzoni and others, he established the periodical Il Conciliatore. In consequence of the liberal spirit displayed in his productions he was in 1820, along with several of his friends, arrested on the charge of belonging to the Carbonari, and in 1822 was condemned to death, but the sentence was commuted to imprisonment in the Austrian prison of the Spielberg for fifteen years. In 1830 he was set at liberty. Pellico has given a most interesting account of his ten years' sufferings in Le Mie Prigioni (My Prisons), which has been translated into many languages. His constitution, naturally feeble, had been completely shattered. The Marchioness of Barolo offered him an asylum at Turin, and he became her secretary. He died in 1854.

Pel'litory, or Spanish Chamomile (*Anacyclus Pyrethrum*), a plant nearly resembling chamomile, of the same order and belonging to an allied genus, a native of the Levant and of Southern Europe. It was introduced into England in 1750, and is chewed to re-

lieve toothache and rheumatism of the gums. A genus of plants (*Parietaria*) of the nettle order is also known as pellitory, or wall-pellitory. The common wall-pellitory (*P. officinālis*) is a herbaceous perennial, with prostrate or erect branched stems, ovate leaves, and small flowers. It contains nitre, and was formerly used as a diuretic.

Pelop'idas, in ancient Greek history, a Theban general and statesman, who lived in intimate friendship with Epaminondas. The supremacy of the Spartan faction in Thebes forced Pelopidas, with other exiles, to take refuge in Athens, but he returned in B.C. 379, and succeeded in overthrowing the Spartan party and recovering the citadel of Thebes. In the war which followed with Sparta Pelopidas distinguished himself in the battle of Tegyra (375) and of Leuctra (371), by which Thebes became for a time the leading power of Greece. In 364 he was sent against Alexander of Pheræ, tyrant of Thessaly, whom he defeated in the battle of Cynoscephalæ, though he himself was slain.

Peloponne'sus (Gr. 'island of Pelops'), the peninsula which comprehends the most southern part of Greece, now called the Morea. Peloponnesus was anciently divided into six states: Messenia, Laconia (Sparta), Elis, Arcadia, Achaia, and Argolis, to which some add Sicyon. See *Greece* and articles on the different states.

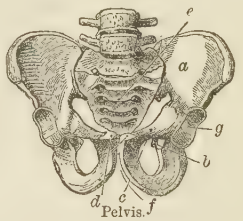
Pe'lops, in Greek mythology, son of Tantalus, king of Lydia. He married Hippodamia, a daughter of King Œnomaus of Elis, and succeeded his father-in-law in that kingdom. Peloponnesus received its name from him. Of his sons, Atreus and Thyestes are most celebrated. Many and very different myths are connected with his name.

Pelo'ria (Gr. *pelōr*, a monster), in botany, the appearance of regularity of structure in the flowers of plants which normally bear irregular flowers, instances of which occur in the snapdragon and the toad-flax, which being normally irregular, assume a symmetrical form.

Peltier, Jean Charles Athanase, French physicist; born 1785, died 1845. He was the author of numerous papers in different departments of physics, but his name is specially associated with the thermal effects at junctions in a voltaic circuit.

Pelu'sium (the 'Sin' of the Scriptures), a city of ancient Egypt, situated on the eastern arm of the Nile delta, about 2½ miles from the sea, near the modern Damietta.

Pelvis (Latin, *pelvis*, a basin), the bony basin formed by the 'haunch-bones' and sacrum of Vertebrata, which constitutes the girdle or arch giving support to the lower or hinder limbs. The pelvis thus corresponds to the shoulder-girdle of the upper or fore limbs; and forms a cavity or basin in which several of the abdominal viscera, and organs relating to reproduction and the urinary functions, are protected and contained. The pelvis consists of four bones, the front and sides being formed by the two *ossa innominata* or innominate bones, and the circle being completed behind by the *sacrum* and the *coccyx*. Each innominate bone consists in early life of three pieces termed *ilium*, *ischium*, and *pubis*, and they meet in front at the *symphysis pubis*. The pelvis of man differs materially from that of woman, the differences having chiefly reference to the greater capacity required for the womb during pregnancy, and for the expulsion of the child at birth. It also varies somewhat in the different races of men.



a, Ilium; *b*, ischium; *c*, pubis; *d*, symphysis pubis; *e*, sacrum; *f*, coccyx; *g*, acetabulum or cavity for head of thigh-bone.

Pem'berton, a town of England, Lancashire, 2½ miles W. of Wigan, with collieries, cotton-mills, chemical works, &c. Pop. 1891, 18,400.

Pem'brey, a seaport of South Wales, in Carmarthenshire, on the Burry Inlet, 5 m. west of Llanelly. It has tin and copper works, and ships considerable quantities of coal. Pop. 5663.

Pem'broke, a parliamentary and municipal borough and seaport of South Wales, capital of the county of the same name, on a creek on the southern side of Milford Haven, 206 miles west of London. On the west side are the picturesque ruins of an ancient castle or fortress erected in 1092, the remains of which give evidence of its former magnificence. On the north-west side is Pembroke Dock, otherwise called Pater, a small village until 1814, when the royal dockyard for the construction of ships of war was removed thither from Milford Haven. The town has now but little trade beyond that connected with the government dock-yard, which comprises an area of about

80 acres, and is strongly fortified. Pop. 14,978. The Pembroke district of parliamentary boroughs returns one member, and comprises Pembroke, Milford, Tenby, Wiston, Haverfordwest, Fishguard, and Narberth.—The COUNTY is bounded by Cardiganshire, Carmarthenshire, the Bristol Channel, and St. George's Channel; area, 391,181 acres, of which about 300,000 acres are under cultivation. Its coast-line is deeply indented, and in the south is the magnificent harbour of Milford Haven. The surface is generally undulating, and greatly diversified with hills and dales. Lead, iron, slate, and coal are worked. In the south part the limestone and Old Red Sandstone formation afford soils of excellent quality, but in the coal and slate districts the land is very inferior. The climate is humid and very mild. Chief towns: Haverfordwest, Pembroke, and Tenby. The county sends a member to parliament. Pop. 1891, 89,125.

Pembroke College, CAMBRIDGE, a college founded in 1347, under the name of Valence-Mary, by Mary de St. Paul, widow of Aymer de Valence, earl of Pembroke. The chapel, which is Corinthian in style, was built by Sir Christopher Wren in 1663.

Pembroke College, OXFORD, originally Broadgates Hall, was founded in the year 1624 by James I., and obtained its name from William Herbert, earl of Pembroke.

Pem'mican, originally a North American Indian preparation consisting of the lean portions of venison dried by the sun or wind, and then pounded into a paste and tightly pressed into cakes. Pemmican made of beef has sometimes been used by travellers.

Pen, an instrument for writing with a fluid. Pens of some sort have been in use from very early times, adapted to the material on which the characters were to be inscribed. The metallic stilus for the production of incised letters was probably the earliest writing implement. It was used by the Romans for writing on tablets coated with wax; but both they and the Greeks also used what is the true ancient representative of the modern pen, namely, a hollow reed, as is yet common in Eastern countries. It has been asserted that quills were used for writing as early as the 5th century A.D. In Europe they were long the only writing implement, the sorts generally used being those of the goose and swan. Up till the end of the first quarter of the present century these formed the principal materials from which pens were made. In 1803 Mr. Wise produced steel pens of a barrel form, mounted in a bone case for carrying in the pocket. They were of indifferent make, and being expensive (costing half-a-crown each originally, though the price was subsequently reduced to sixpence), were very little used. Joseph Gillott commenced the manufacture about 1820, and succeeded in making the pen of thinner and more elastic steel, giving it a higher temper and finish. Mr. Gillott was followed into the same field by Mr. Perry and others, and their improvements have so reduced the cost and raised the quality, that a gross of better pens are now sold by the same makers at one-sixth of the price of a single pen in 1821. Cast-steel of the finest quality is used in the manufacture, and the various operations are performed by cutting, stamping, and embossing apparatus worked mostly by hand-fly presses. Birmingham was the first home and is still the principal centre of the steel-pen industry. Gold pens tipped with minute particles of iridium are now in somewhat extensive use, and a good one will last for years. Fountain pens and penholders, to carry a considerable supply of ink and to discharge it in an equal manner, were invented by Joseph Bramah. The most successful form of fountain pen yet introduced is the stylograph, patented in the United States by Cross 1878, and by Mackinnon 1879.

Pen, a town of India in Kolába district, Bombay Presidency. Pop. 8082.

Penal Law. See *Criminal Law.*

Penal Servitude, in Britain, a punishment for criminal offences, ranging from five years up to the life of the convict. It was substituted for transportation when that punishment was abolished (1857).

Penance, in theology, a punishment accepted or self-imposed by way of satisfaction and in token of sorrow for sin. In the early Christian church penances were of three kinds—secret, public, and solemn. The first consisted of such actions as are commonly imposed by confessors at the present day, as the repetition of certain prayers, &c. Public penance was in use from the earliest days of the church. It was often very severe, and the penitents had to make a public confession of their sins in the church. It became gradually the custom of the bishops to commute the canonical penances for pious works, such as pilgrimages, alms-deeds, and other works of charity—and these again were exchanged for indulgences. In the Roman

Catholic Church penance is one of the seven sacraments. The matter of it consists of the three acts of the penitent: 1. Contrition, or heartfelt sorrow for sin as being an offence against God; 2. Confession to an authorized priest; and 3. Satisfaction, or the acceptance and performance of certain penitential works in atonement of the sin; and the form of the sacrament is the sentence of absolution from sin pronounced by the priest who received the confession, and has been satisfied of the earnest repentance of the sinner. According to the doctrine of the Protestants there is no such sacrament; they consider repentance and faith as the only requisites for forgiveness.

Penang', PULO-PENANG, or PRINCE OF WALES ISLAND, an island belonging to Great Britain, lying at the north entrance of the Straits of Malacca, off the west coast of the Malay Peninsula, from which it is separated by a channel 2 to 5 miles across; area, 107 sq. miles. Two-fifths of Penang is plain, and the rest hills—for the most part wooded—which rise to a height of 2734 feet in the peak now used as a sanatorium. The climate is hot, but very healthy. The scenery is charming. The island produces cocoa-nuts and areca-nuts, nutmegs and cloves, rice, sugar, coffee, and pepper. George Town, or Penang (pop. 44,267), the capital and port of the settlement, is a handsome town, rapidly increasing in size, and has a large commerce. The harbour is the strait between island and mainland. Penang was made over by treaty to the East India Company in 1786 by the Rajah of Quedah, and with Province Wellesley, a long strip of the Malay Peninsula opposite (area, 270 square miles), it now forms one of the Straits Settlements, having a resident councillor to control administration. Total of exports and imports in 1888, £18,000,000. Pop. of Penang, 90,951, of Province Wellesley, 97,294.

Penarth', a seaport of South Wales, in Glamorgan, at the mouth of the river Taff, 3 miles south of Cardiff. Penarth was an obscure village until the formation of its docks (1865–84), which have made it an important shipping port for the minerals of South Wales. It is frequented in summer as a bathing-place and seaside resort. Pop. 1891, 12,422.

Pena'tes, the private or public gods of the Romans. The images of these gods were kept in the penetralia, or central part of every house, each family having its own Penates and the state its public Penates. The Lares were included among the Penates, but were not the only Penates; for each family had generally but one Lar, whereas the Penates are usually spoken of in the plural. Their worship was closely connected with that of Vesta.

Pencil, an instrument used for painting, drawing, and writing. The first pencils used by artists were probably pieces of coloured earth or chalk cut into a form convenient for holding in the hand. On the introduction of moist colours, however, delicate brushes of fine hairs were used. Pencils of this kind, and of various degrees of fineness, are now almost solely used by painters for laying on their colours; but in China and Japan they are generally employed, instead of pens, for writing. The hairs used for these pencils are obtained from the camel, badger, squirrel, sable, goat, &c. The hairs, being selected, are bound in a little roll by a string tied tightly round their root ends. The roll is then fixed into the end of a quill tube. For larger pencils a socket of tin-plate is used instead of the quill. Black-lead pencils, for writing or drawing, are made of slips of graphite or plumbago (otherwise known as black-lead), generally cased in cedar wood. The finest qualities of graphite used to be obtained only from the Borrowdale mines in Cumberland. Blocks of graphite, however, are now rarely found of such size and purity that they can be sawn up into the small square slices of ordinary pencil length; but a method has been devised of purifying the inferior varieties, which are ground to a fine powder, levigated or washed until pure, intimately mixed with clay in various proportions, and afterwards solidified by pressure. The comparative hardness and blackness of pencils are attained by the degree of heat to which they are subjected and the proportions of graphite and clay in the leads. Nuremberg is the great centre of the lead-pencil trade. Coloured pencils are prepared from various chalks, such as are used for crayons, instead of the graphite. Pencils for writing on slate are made by cutting slate into small square pieces and rounding them, or into narrow slips and incasing them in wood.

Pendant, or PENNANT, in the royal navy, a sort of long narrow banner with St. George's Cross next the staff, displayed from the main mast-head of a ship-of-war, and usually terminating in two ends or points, called the *swallow's tail*. It denotes that a vessel is in actual service. The long pendant in the royal navy is borne of two colours,

one white, the other blue. The white pendant is borne at the mast-head of all ships in commission when not otherwise distinguished by a flag or broad pendant. The blue pendant is borne at the mast-head of all armed vessels in the employ of the government of a British colony. The broad pendant is a kind of flag terminating in one or two points, used to distinguish the chief of a squadron.

Pendant, in architecture, is a hanging ornament used in the vaults and timber roofs of Gothic buildings, more particularly in late Gothic work. In vaulted roofs pendants are of stone, and generally richly carved; in timber roofs they are of wood variously decorated. Fine examples of stone pendants are to be seen in the chapel of Henry VII. at Westminster Abbey.

Penden'tive, in architecture, the portion of a dome-shaped vault which descends into a corner of a quadrangular opening when a

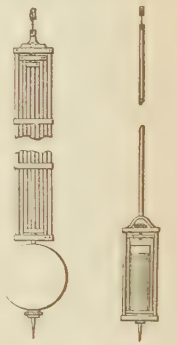
Pendentive Roof, Salisbury Cathedral.
a a a, Pendentives.

ceiling of this kind is placed over a straight-sided area; in Gothic architecture, the portion of a groined ceiling springing from one pillar or impost, and bounded by the ridges or apices of the longitudinal and transverse vaults.

Pendulum, in the widest sense, a heavy body suspended so that it is free to turn or swing upon an axis which does not pass through its centre of gravity. Its only position of stable equilibrium is that in which its centre of gravity is in the same vertical plane with the axis. If the body is displaced from this position it will tend to return to it, and it will oscillate or swing from one side of that position to the other until its energy is destroyed by friction, and it at length comes to rest. A small, heavy body suspended from a fixed point by a string, and caused to vibrate without much friction, is called a 'simple pendulum.' When the swings of a simple pendulum are not too great—that is, when they are never more than about 3° on each side of the position of rest—the pendulum is isochronous, that is each swing occupies the same time, and its period is true to the law—

$$T = 2\pi\sqrt{\frac{l}{g}};$$

where T is the period of a complete vibration, π is the well-known mathematical number 3·1416, l the length of the pendulum in feet, and g the acceleration due to gravity, or 32·19 feet per second at London. The 'seconds' pendulum has for its time of vibration (half its complete period) one second. In the above equation, putting for T two seconds, and for g 32·19, we find the length of the seconds pendulum at London to be 3·26 feet, or 39·1398 inches. A true simple pendulum is a mathematical abstraction: a heavy particle, an inextensible and inflexible weightless string, and no friction; these conditions are only approximated to in nature. The ordinary pendulum is what is properly a 'compound pendulum.' A compound pendulum, as seen in clocks, is usually a rigid, heavy, pendulous body, varying in size according to the size of the clock, but the 'seconds' pendulum may be considered the standard. The pendulum is connected with the clockwork by means of the escapement, and is what renders the going of the clock uniform. (See *Clock*.) In a clock it is necessary that the period of vibration of the pendulum should be constant. As all substances expand and contract with heat and cold, the distance from the centre of suspension to the centre of gravity of a pendulum is continually altering. Pendulums constructed so that increase or diminution of temperature do not affect this ratio are called compensation pendulums. These take particular names, according to their forms and materials, as the *gridiron pendulum*, the *mer-*



Gridiron Pendulum — Mercurial Pendulum.

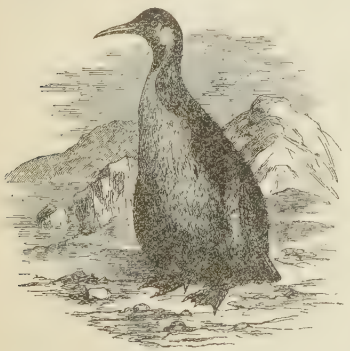
curial pendulum, &c. The former is composed of a number of rods so connected that the expansion or contraction of certain of them is counteracted by that of the others. The *mercurial pendulum* consists of one rod with a vessel containing mercury at the lower end, so adjusted in quantity that whatever alterations take place in the length of the pendulum, the centre of oscillation remains the same, the mercury ascending when the rod descends, and *vice versâ*.

Pene'do, a town of Brazil, in the province of Alagoas, near the mouth of the San Francisco River. Pop. 9000.

Penel'opē, in Greek mythology, the wife of Odysseus (Ulysses) and mother of Telemachus, who was but an infant when his father sailed against Troy. During the protracted absence of Odysseus, Penelopē was surrounded by a host of suitors, whom she put off on the pretext that before she could make up her mind she must first finish a large robe which she was weaving for her father-in-law Laërtes. To gain time she undid by night the work she had done by day. Her stratagem was at last communicated to the suitors by her servants, and her position became more difficult than before; but fortunately Odysseus returned in time to protect his spouse, and slay the obnoxious wooers who had been living in riot and wasting his property.

Penelope, a genus of gallinaceous birds. See *Guan*.

Penguin, a family of natatorial or swimming birds adapted for living almost entirely



King Penguin (*Aptenodytes patagonica*).

in the water. They possess only rudimentary wings, destitute of quill-feathers, and covered with a scaly integument or skin. Although useless as organs of flight the wings are very effective aids in diving, and on land they may be used after the fashion of fore-limbs. The legs are placed at the hinder extremity of the body, and the birds assume an erect attitude when on land. The toes are completely webbed. They inhabit chiefly the high southern latitudes, congregating sometimes in colonies of from 20,000 to 40,000. There are three different types of penguins, represented by the king penguin, the jackass penguin, and the rockhopper, constituting respectively the generic groups *Aptenodytes*, *Spheniscus*, and *Catarractes*. The jackass penguin and the rockhopper are about 2 ft. 3 in. in height, and the king penguin somewhat larger; but a fossil penguin of the upper Eocene stood from 6 to 7 feet high.

Penicillium, a genus of fungous plants found on decaying bodies and in fluids in a state of acetification. *P. glaucum* is the ultimate state both of the vinegar-plant and the yeast-plant, called in its first stage *Torula cerevisiæ*.

Penicu'ik, a town of Scotland, in Midlothian, on the North Esk, 10 miles south of Edinburgh. It has paper-mills, and coal, shale, and ironstone mines. Pop. 3793.

Penin'sula (L. *pene*, almost, and *insula*, an island), a portion of land almost surrounded by water, and connected with the mainland by a narrow neck or isthmus. This term when preceded by the definite article is frequently applied to Spain and Portugal conjointly.

Peninsular War, The, was caused by the intrigues and ambition of Napoleon, who proposed the partition of Portugal (1807), and placed his brother Joseph upon the throne of Spain. For a time the whole peninsula was occupied by French troops, but the Spanish and Portuguese peoples rose in defence of their liberties, and waged a fierce guerilla warfare against the invaders. Britain joined the patriots in 1808. Of the memorable struggle which ensued the main features were the retreat of Sir John Moore to Coruña, and his glorious death there; the accession of Sir Arthur Wellesley (afterwards Duke of Wellington) to the supreme command; his formation of the celebrated lines of Torres Vedras, where he held the French armies in check until he had accomplished the complete liberation of Portugal; and his subsequent victorious march through Spain, marked by the great battles of Salamanca (1812) and Vittoria (1813). In

the spring of 1814 the tide of war rolled through the passes of the Pyrenees into the south of France, where this great struggle was concluded by the crowning victory of Toulouse.

Pen'istone, a market-town of England, West Riding of Yorkshire, 12 miles north-west of Sheffield, with steel-works and other industries. Pop. 2254.

Penitential Psalms, the seven psalms vi. xxxii. xxxviii. li. cii. cxxx. cxliii. of the Authorized Version, so termed as being specially expressive of contrition. Reference is made to them by Origen. They have a special place in the breviary of the Roman Church. The psalm most frequently repeated as being the most penitential is the Miserere, the li. of the Authorized Version.

Penitentiary, a prison in which convicted offenders are confined and subjected to a course of discipline and instruction with a view to their reformation. The two systems of penitentiaries in the U. States are known as the Penna. and N. Y. systems.

Penitentiary, at the court of Rome, an office in which are examined and delivered out the secret bulls, graces, or dispensations relating to cases of conscience, confession, &c.; also an officer in some Roman Catholic cathedrals, vested with power from the bishop to absolve in cases referred to him. The pope has a grand penitentiary, who is a cardinal and is chief of the other penitentiaries.

Penn, WILLIAM, the founder of the state of Pennsylvania, was born in London in 1644. He was the only son of Admiral Sir William Penn. In his fifteenth year he was entered as a gentleman commoner of Christ Church, Oxford, where he imbibed Quaker views, and was expelled from the university. His father sent him on travels in France and Holland, and in 1666 committed to him the management of a considerable estate in Ireland. At Cork he was committed to prison for attending Quaker meetings, and although he was very soon liberated he had to leave Ireland. In 1668 Penn appeared as a preacher and an author, and on account of an essay, entitled The Sandy Foundation Shaken, he was imprisoned in the Tower, where he remained seven months. During this time he wrote his most celebrated work, No Cross, no Crown, and Innocency with her Open Face. In 1670 Sir William died, fully reconciled to his son, to whom he left his estates and all his property. This same year the meetings of Dissenters were forbidden, under severe penalties. The Quakers, however, continued to meet as usual, and Penn was once more put into prison for six months. The persecutions of Dissenters continuing to rage, Penn turned his thoughts towards the New World. From his father he had inherited a claim upon the government of £16,000, and in settlement of this claim the government in 1681 granted him large territories in North America, the present state of Pennsylvania, with right to found a colony or society with such laws and institutions as expressed his views and principles. The following year Penn went over to America and laid the foundations of his colony on a democratical basis, and with a greater degree of religious liberty than had at that time been allowed in the world. A great number of settlers, not only Quakers, but members of all denominations, Englishmen, Germans, Swedes, gathered together; the city of Philadelphia was laid out upon the banks of the Delaware, and the colony soon came into a most flourishing condition. He remained in the province about two years, adjusting its concerns, and establishing a friendly intercourse with his colonial neighbours. Soon after Penn returned to England King Charles died (1685); and the respect which James II. bore to the late admiral, who had recommended his son to his favour, procured to him free access at court. He made use of this advantage to solicit the discharge of his persecuted brethren, 1500 of whom remained in prison at the decease of the late king; and his influence is thought to have hastened, if it did not occasion, the proclamation for a general pardon, and the repeal of religious tests and penalties. At the Revolution in 1688 Penn's intimacy with the abdicated monarch created suspicions, in consequence of which he was accused of treason, and withdrew from public notice till 1693. In 1699 he again sailed for Pennsylvania, intending to make it the place of his future residence; but he returned to England again in 1701. He died at Ruscombe, Berks, 30th July, 1718.

Pennant. See *Pendant*.

Pennant, BASE BALL, is the trophy contended for by the clubs in the various Base-Ball Leagues. It is of silk and purchased out of the league's funds and presented to the club winning the most games of the season in that league.

Pennant, THOMAS, English naturalist and antiquary, born at Downing, in Flint-

shire, in 1726, and studied at Oxford. He early devoted himself to natural history and archæology. In 1761 he published the first part of his British Zoology, which gained him considerable reputation both in Britain and on the Continent. In 1765 he made a journey to the Continent, where he visited Buffon, Haller, Pallas, and other eminent foreigners. He was admitted into the Royal Society in 1767; and in 1769 he undertook his first tour into Scotland, where he met with a flattering reception. After a busy life of literary labour and research he took leave of the public in 1793 in an amusing piece of autobiography—the Literary Life of the late Thomas Pennant. He died in 1798. His chief works are British Zoology (1761–69), Synopsis of Quadrupeds (1771), Genera of Birds (1773), Arctic Zoology (3 vols. 1784–87), Tours in Scotland (3 vols. 1790), Tour in Wales (2 vols. 1778–81), and Account of London (1790).

Pennat'ula, a genus of Cœlenterate animals (popularly known by the name of 'sea-pens' or 'cocks'-combs'), class Actinozoa, order Alcyonaria. The sea-pens consist each of a compound organism, which may be described as consisting of a main stem or *cœnosarc*, with lateral pinnæ or branches. These branches are crowded on their upper margins with the little polyps or individual animals that make up the compound mass, and which are connected together through the fleshy medium or cœnosarc. The lower end of the stem is fleshy, destitute of polyps, and contains an internal coral-rod. By this fleshy root the sea-pens attach themselves loosely to the mud of the sea-bed. The British species (*P. phosphorĕa*), averaging about 3 or 4 inches in length, derives its scientific name from its property of emitting a phosphorescent light.

Pennatula (*P. rubra*).

Pennon, a small triangular flag carried by the knights of the middle ages near the points of their lances, bearing their personal devices or badges, and sometimes richly fringed with gold.

Pennsylvania, one of the United States of North America, bounded by New York, Lake Erie, Ohio, W. Virginia, Maryland, Delaware, and New Jersey; area, 45,215 square miles. Except on the east, where the river Delaware forms an irregular boundary line, its sides form an almost exact parallelogram facing the cardinal points. The surface is traversed south-west to north-east by the Alleghany chain, and covered by many smaller ranges, which are more or less parallel to it. On the east side the Alleghanies are rugged and steep, but on the west descend very gradually, and then stretch out into an extensive table-land. The principal rivers are the Delaware, which receives the Lehigh and the Schuylkill; the Susquehanna; and the Alleghany, which unites at Pittsburg with the Monongahela to form the Ohio. Pennsylvania is one of the healthiest states of the Union. The soil has various grades of fertility, but is in general well adapted for agricultural operations. The richest and most highly cultivated tract is south-east of the mountains on both banks of the Susquehanna. The most important crops are Indian corn, oats, wheat, rye, and buckwheat. Coal, iron, and salt are found in almost exhaustless abundance. In the mountain districts of the south and east to the west of the Susquehanna an anthracite coal-field occurs over an area estimated at 472 square miles; while to the west of the Alleghanies a vast bituminous coal-field, of which Pittsburg may be considered the centre, has been traced over an area of 12,300 square miles. The coal strata of both these fields contain many valuable seams of ironstone, and both the smelting and working of iron have long been regarded as the most important interest of the state. An accession of immense value was the discovery of petroleum in 1859. In the amount of its manufactures the state is second only to New York. Both the foreign and inland trade have been largely developed. The railways have a length of some 7000 miles. The largest religious denomination is the Methodist Episcopal. Education is free but not compulsory. Among the higher educational institutions are the University of Pennsylvania, Philadelphia, and Pennsylvania College, Gettysburg. Harrisburg, though an insignificant place compared with Philadelphia, Pittsburg, and several other towns, continues to be the capital. The first settlement in the state was made by a company of Swedes in

1688. The Dutch afterwards gained possession, but it was wrested from them by the English in 1664. A subsequent settlement was made in 1682 by William Penn, from whom the state has derived its name. In 1800 the population was 602,361; in 1880, 4,282,891; in 1890, 5,258,014.

Pennsylvania Dutch, a German dialect mixed with English spoken in Pennsylvania by German settlers and their descendants.

Penny, a British coin (formerly of copper, since 1860 of bronze) and money of account, the twelfth part of a shilling. It was at first a silver coin weighing about 22½ grains troy, or the two-hundred-and-fortieth part of a Saxon pound. Till the time of Edward I. it was so deeply indented by a cross mark that it could be broken into halves (thence called halfpenny) or quarters (fourthings or farthings). Its weight was steadily decreased till at last, in the reign of Elizabeth, it was fixed at $7\frac{2}{11}$ grains, or the sixty-second part of an ounce of silver. Copper pennies were first coined in 1797, but copper halfpennies and farthings had been in use from 1672. The old Scots penny was only $\frac{1}{12}d.$ sterling in value, the pound being equal to 20*d.* sterling.

Penny Banks, banks which receive deposits of amounts as small as one penny. Most of these banks place their funds in the post-office savings-banks, and their depositors have thus the additional benefit of knowing that their money is safe. So soon as his deposits amount to £1 the depositor in a penny bank connected with the post-office is assisted to open a separate account in his own name at the post-office savings-bank; but as no deposit of less than a shilling is received by the post-office he is permitted to pay into the penny bank as before—the limit of such penny bank being £5. Penny banks exist in most towns throughout Great Britain, and are a great boon to the poorer classes of the community.

Pennyroyal, a species of mint (*Mentha Pulegium*) formerly in considerable repute as a medicine, but now almost totally neglected. See *Mint*.

Penny Wedding, a wedding where the guests contribute toward the outfit of the wedded pair, or at least towards the expenses of the wedding entertainment. Such marriages were till the early part of the 19th century not uncommon in Scotland.

Pennyweight, a troy weight containing 24 grains, each grain being equal in weight to a grain of wheat from the middle of the ear, well dried. It was anciently the weight of a silver penny, hence the name.

Penobscot, the largest river of Maine, United States of America. It flows 300 miles south by west to Penobscot Bay. It is navigable for ships to Bangor, 60 miles, where the tide rises 17 feet.

Penrhyn Islands, a group in the Pacific Ocean, lat. 9° 2′ S.; lon. 157° 35′ W. They are densely wooded and populous. The British flag was hoisted on the Penrhyn Islands in 1888.

Penrith, a market-town of England, in the county of Cumberland, 17 miles south by east of Carlisle. It has a grammar-school founded 1340, is well built, and is a prosperous place, its market being the centre of a large agricultural trade. Pop. 9268.

Penryn, an ancient municipal and parliamentary borough, market-town, and seaport of England, in the county of Cornwall, 2 miles north-west of Falmouth, at the head of a branch of Falmouth harbour. The port is included in that of Falmouth, and Penryn forms part of the parliamentary borough of Penryn and Falmouth, which returns one member to parliament. Pop. of Penryn, 3256; of parl. bor. of Penryn and Falmouth, 1891, 17,533.

Pensacola, a port of entry and capital of Escambia county, Florida, United States,

on Pensacola Bay, 64 miles east of Mobile. Pensacola suffered considerably in 1861 during the American civil war. Vessels drawing 25 feet can approach the town, and the bay is one of the safest and most capacious in the Gulf of Mexico. It has been selected as a naval station and depot, and

is well defended by several strong forts. Pop. 1890, 11,750.

Pensionary, one of the chief magistrates of towns in Holland. The *Grand Pensionary* was the first minister of the United Provinces of Holland under the old republican government.

Pensions, annual allowances of money settled upon persons, usually for services previously rendered. In Britain the only civil pensions conferred are those payable to certain ministers of state, &c., on retirement after a number of years' service, and these smaller sums called the civil list pensions, for which a total sum of £12,000 is annually allotted. These latter pensions are assigned to those who, by their personal services to the crown, by the performance of duties to the public, or by their useful discoveries in science and attainments in literature and the arts, have merited the gratitude of their country. The pensions to ordinary civil servants of the crown, which until lately were made up by deductions from annual salary, are more commonly called superannuation allowances. In the *army* pensions are allowed to non-commissioned officers and soldiers who have served twenty-one years in the infantry or twenty-four years in the cavalry, or earlier if they are compelled to quit the service by ill health, wounds, or reduction of force. The amount is fixed according to individual merits by the commissioners for Chelsea Hospital, and ranges from 3s. 10*d*. to 1s. 1*d*. a day. In-pensioners are soldiers quartered at Chelsea and Kilmainham Hospitals, who, instead of their ordinary pensions, are fed and clothed by government, and receive a small allowance for pocket-money. The out-pensioners draw their pensions, live where they please, and frequently follow other pursuits. A pension is forfeited if the holder be convicted of felony. Pensions entitled 'rewards for distinguished services,' are granted to officers in consideration of meritorious services: the officers to whom they are awarded are generally major-generals and colonels. The ordinary pensions or retiring allowances of officers are known as half-pay. *Naval* pensions are given to petty officers, seamen, and marines, under principles essentially similar to those for the army, with the exception that since 1865 there are no in-pensioners. Pensions for wounds are common to both services, but are restricted to officers, although wounds may hasten or augment the pensions of common soldiers and sailors. The total annual sum appropriated to pensions, &c., connected with the army and navy amounts to upwards of £5,000,000. In the United States the pension system differs from that of most other countries; pensions, with few exceptions, are granted only on account of military service; having no large standing army, its pensions are given chiefly to volunteers and drafted men. Since the civil war the pension system has developed from a very small establishment to a great Bureau. The appropriations made by Congress have increased yearly. In 1861 there was disbursed on account of pensions $1,072,461. There were 966,012 pensioners on the rolls, June 30, 1893, an increase for the year of 39,944. Of these there were 17 widows and daughters of revolutionary soldiers; 86 survivors of the war of 1812; 5425 widows of soldiers of that war; 21,518 survivors and widows of the Mexican war; 3882 survivors and widows of the Indian wars; 284 army nurses; and 475,645 survivors, and widows and children of deceased soldiers and sailors, of the civil war. There were also on the rolls 459,155 persons pensioned under the act of June 27, 1890, allowing pensions on account of death and disability not chargeable to army service. The sum expended on account of pensions for fiscal year 1893 was $156,740,467.14. The estimated sum for payment of pensions in 1894 is $165,000,000.

Pen'tagon, a figure of five sides and five angles; if the sides and angles be equal it is a regular pentagon; otherwise, irregular.

Pentagraph. See *Pantograph.*

Pentam'era, one of the primary sections into which coleopterous insects (beetles) are divided, including those which have five joints on the tarsus of each leg.

Pentam'eter, in prosody, a verse consisting of five feet. It belongs more especially to Greek and Latin poetry. The two first feet may be either dactyls or spondees, the third is always a spondee, and the two last anapests. A pentameter verse, subjoined to a hexameter, constitutes what is called the elegiac measure.

Pen'tateuch, the Greek name applied to the first five books in the Bible, called also the Law of Moses (Hebrew, *Torah Mosheh*), or simply the Law (*Torah*). The division of the whole work into five parts has by some authorities been supposed to be original; others, with more probability, think it was

so divided by the Greek translators, the titles of the several books being Greek, not Hebrew. It begins with an account of creation and the primeval condition of man; of the entrance of sin into the world, and God's dealing with it, broadening out into a history of the early world, but again narrowing into biographies of the founders of the Jewish family; it then proceeds to describe how the family grew into a nation in Egypt, tells us of its oppression and deliverance; of its forty years' wandering in the wilderness; of the giving of the law, with all its civil and religious enactments; of the construction of the tabernacle; of the census of the people; of the rights and duties of the priesthood; and concludes with the last discourses of Moses and his death. The Pentateuch and the book of Joshua are sometimes spoken of together as the *Hexateuch;* when Judges and Ruth are added, as the *Octateuch.*

Until nearly the end of last century the conviction that Moses wrote the complete work, with the exception of the last chapter or so of Deuteronomy, ascribed to Joshua, might be said to have been universally adhered to; but previously to this the question whether the Pentateuch was the work of one man or of one age, and what share Moses had in its composition, had been discussed seriously and with more or less critical investigation. Spinoza, in a work published in 1679, maintained that we owe the present form of the work to Ezra. A scientific basis was given to the investigation by Jean Astruc (1753), who recognized two main documentary sources in Genesis, one of which used the name *Elohim* and the other *Jehovah* for God. This 'documentary theory' gave way to the 'fragmentary theory' of Vater (1815) and Hartmann (1818), who maintained that the Pentateuch was merely a collection of fragments thrown together without order or design. This theory has now lost its popularity by the substitution of another, called the 'supplementary hypothesis,' whose leading principle is that there was only one original or fundamental document (the Elohistic) giving a connected history from first to last, such as we have in the Pentateuch; but that a later editor (the Jehovist), or several successive editors, enlarged it to its present extent, sometimes very greatly, by the insertion of additional matter from other sources, whether these had appeared in a written form already, or whether they were still floating in the minds of the people as traditions. The book of Joshua is now generally regarded as in its character belonging to and completing the Pentateuch. De Wette was the first to concern himself (early in the present century) with the historical apart from the literary criticism of the Pentateuch, and refused to find anything in it but legend and poetry. The discussions on these points, which until recently were mainly led by German theologians, have latterly been taken up by English biblical critics, among the earliest being Dr. Davidson and Bishop Colenso.

Among those critics of the present day who deny the Mosaic authorship of the Pentateuch there is a tendency to recognize three elements or component parts welded together in the whole work (including Joshua). One of these is the fundamental or Elohistic document, which is partly historic in its matter but mainly legal, embracing Leviticus and parts of Exodus and Numbers. Another element consists of the Jehovistic, which is almost entirely narrative and historical, and to which belongs the history of the patriarchs, &c. The third component element is Deuteronomy, the second giving of the law, as the name signifies. The respective antiquity of the several portions has been much disputed, many critics making the Elohistic the earliest, the Jehovistic second, Deuteronomy last. Some modern critics, however, put the Elohistic section last, believing it to have been drawn up during the exile and published by Ezra after the return; while the Jehovistic section is assigned to the age of the early kings, and Deuteronomy to the reign of Josiah.

Pen'tecost (from the Greek *pentēkostē*, the fiftieth), a Jewish festival, held on the fiftieth day after the passover, in celebration of the ingathering and in thanksgiving for the harvest. It was also called the *Feast of Weeks,* because it was celebrated seven weeks after the passover. It is also a festival of the Christian church, occurring fifty days after Easter, in commemoration of the descent of the Holy Ghost on the disciples, called in England *Whitsuntide.*

Penthesile'a, in Greek mythology, a queen of the Amazons (which see).

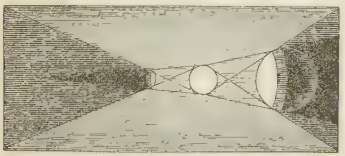
Penthièvre (pāṇ-tyāvr), an ancient county of Brittany, now forming the French department of Morbihan. It belonged in earlier times to several branches of the house of Brittany, but at a later period came to the houses of Brosse and Luxembourg, and in 1569 was

erected in their favour by Charles IX. into a dukedom. It afterwards fell to the crown, and was given, in 1697, by Louis XIV. to one of his illegitimate sons by Madame de Montespan, the Count of Toulouse, who died in 1737. His only son and heir was Louis Jean Marie de Bourbon, duke of Penthièvre, born in 1725, died 1793; served as general at Dettingen and Fontenoy, and was father-in-law to King Louis Philippe.

Pentland Firth, a channel separating the mainland of Scotland from the Orkney Islands, and connecting the North Sea with the Atlantic Ocean. It is about 17 miles long east to west, and 6 to 8 miles broad. A current, setting from east to west, flows through it with a velocity of 3 to 9 miles an hour, causing many eddies, and rendering its navigation difficult and dangerous.

Pentland Hills, a range of Scotland, in the counties of Edinburgh, Peebles, and Lanark, commencing 4½ miles south by west of Edinburgh, and extending south-west for about 16 miles. The highest summit, Scald Law, is 1898 feet above sea-level.

Penum'bra, the partial shadow between the full light and the total shadow caused by an opaque body intercepting the light from a luminous body, the penumbra being



Umbra and Penumbra.

the result of rays emitted by part of the luminous body. An eye placed in the penumbra would see part of the luminous body, part being eclipsed by the opaque body; an eye placed in the 'umbra,' or place of total shadow, would receive no rays from the luminous body; an eye placed anywhere else than in the penumbra and umbra sees the luminous body without eclipse. The subject is of importance in the consideration of eclipses. In a partial eclipse of the sun, as long as any part of the same is visible the parties observing are in the *penumbra;* when the eclipse is total, in the *umbra.* The cut shows the phenomena of the umbra and penumbra in the case of a luminous body between two opaque bodies, the one larger, the other smaller than itself. See also *Eclipse.*

Penza, a government of Russia, bounded by Nijni-Novgorod, Tambov, Saratov, and Simbirsk; area, 14,996 square miles; pop. 1,356,600. Its surface, though generally flat, is intersected by some low hills separating the basins of the Don and Volga. About 60 per cent of the soil is arable, the chief crops being rye, oats, buckwheat, hemp, potatoes, and beet-root, and about 14 per cent is under meadows or grazing land. The forests are extensive. The chief exports are corn, spirits, timber, metals, and oils.—PENZA, the capital, is on an eminence at the junction of the Penza and Sura, 440 miles south east of Moscow. It was founded in 1666 as a defence against Tartar incursions, is mostly built of wood, has a cathedral, several other churches, a theatre, &c. Pop. 41,650.

Penzance', a municipal borough and seaport of England, in the county of Cornwall, picturesquely situated on the north-west of Mount's Bay, 26 miles south-west of Truro. The harbour has accommodation for large vessels, and there is a considerable export of tin and copper, china-clay, and pilchards. The pilchard and other fisheries employ many persons. Penzance has a fine climate and pleasant environs, and is becoming a favourite watering-place. Pop. 12,409.

Pe'ony (*Pæonia*), a genus of plants belonging to the natural order Ranunculaceæ, and very generally cultivated in gardens for the sake of their large showy flowers. The species are mostly herbaceous, having perennial tuberous roots and large deeply-lobed leaves. The flowers are solitary, and of a variety of colours, crimson, purplish, pink, yellow, and white. The flowers, however, have no smell, or not an agreeable one, except in the case of a shrubby species, *P. Moutan*, a native of China, of which several varieties, with beautiful whitish flowers stained with pink, are cultivated in gardens. The roots and seeds of all the species are emetic and cathartic in moderate doses. *P. officinālis* or *festīva*, the common peony of cottage gardens, was formerly in great repute as a medicine.

People's Palace, a building in the East End of London, situated in Mile-end Road, opened by the queen, May, 1887. It provides for the population of the East End a hall for concerts, entertainments, &c., a library and reading-rooms, gymnasia, swimming-baths, social-meeting rooms, rooms for games, refreshment rooms, a winter-garden, technical schools, &c. The nucleus of the

palace was the Beaumont Institute, founded by Mr. J. T. B. Beaumont (died 1840), who left £12,500 to establish an institution for the moral and intellectual improvement of the working-classes in the East End of London. A movement set on foot by a novel by Mr. Walter Besant — All Sorts and Conditions of Men — resulted in raising the fund to £75,000, the chief contributors being the Drapers' Co., the Royal Family, the Duke of Westminster, Sir Ed. Guinness, &c., and the establishment of the People's Palace.

Peo'ria, a city of the United States, capital of Peoria co., Illinois, on the west bank of the Illinois River (here called from its width Lake Peoria). Peoria is a great railway centre, and is connected with St. Louis by river steamers and with Chicago by the Michigan Canal. It is a rapidly rising place, the seat of a large grain traffic, and has great iron-works and other manufacturing establishments. Pop. 41,024.

Peperi'no, the Italian name for a volcanic rock composed of sand, scoriæ, cinders, &c., cemented together. It is so named from the small peppercorn-like fragments of which it is composed. The Tarpeian Rock in Rome is composed of red peperino, and the catacombs are the hollows of old quarries dug in it.

Pepin, the name of two distinguished Frank rulers of the 8th century, under the last kings of the Merovingian dynasty. — 1. Pepin of Heristal, major-domo at the court of Dagobert II., was, after the death of the king, appointed Duke of the Franks, and under a feeble regency ruled the kingdom with almost despotic sway. Charles Martel was his natural son. — 2. Pepin le Bref, son of Charles Martel, was, by agreement with the pope, proclaimed King of the Franks in 752, after the deposition of Childeric III. He defeated the Longobards in Italy, and made the Holy See a present of the lands which he conquered from them—the origin of the temporal power of the popes. He became the founder of the Carlovingian dynasty, being succeeded at his death in 768 by his son, Charles the Great, usually called Charlemagne.

Pepper (*Piper*), a genus of plants, the type of the natural order Piperaceæ. The *Piper nigrum*, which furnishes the black pepper of commerce, is a native of the East Indies, where it is cultivated on an extensive scale. It is a climbing plant with broad, ovate, acuminate leaves, and little globular berries, which, when ripe, are of a bright red colour. The pepper of Malacca, Java, and especially of Sumatra, is the most esteemed. Its culture has been introduced into various other tropical countries. White pepper is the best and soundest of the berries, gathered when fully ripe, and deprived of their external skin. The *Chavica Betle*, or betel, belongs to the same natural order. Cayenne pepper, Guinea pepper, bird pepper, &c., are the produce of species of *Capsicum*, natural order Solanaceæ. Jamaica pepper is pimento or allspice.

Black Pepper (*Piper nigrum*).

Peppercorn Rent, a nominal rent to be paid on demand. A nominal rent of one peppercorn a year is an expedient for securing acknowledgment of tenancy in cases where houses or lands are let virtually free of rent.

Peppermint. See *Mint.*

Peppermint-tree, the *Eucalyptus piperita*, a native of New South Wales.

Pepper-pot, a much-esteemed West Indian dish, the principal ingredient of which is cassareep (which see), with flesh of dried fish and vegetables, chiefly the unripe pods of the ochro, and chillies.

Pepperwort, a plant of the genus *Lepidium*, one species of which (*L. sativum*), the common garden cress, is cultivated for the table. See also *Dentaria.*

Pep'sine, an active principle of the gastric juice, a peculiar animal principle secreted by the stomach. The pepsine or pepsia of pharmacy is a preparation of the mucous lining of the stomach of the pig or calf. It is often prescribed in cases of indigestion connected with loss of power and tone of the stomach.

Pepys (peps or pep'is), Samuel, secretary to the admiralty in the reigns of Charles II. and James II., was born at Brampton, Huntingdonshire, 1632, and educated at Cambridge. He early acquired the patronage of Sir Edward Montagu, afterwards Earl of Sandwich, who employed him as secretary in

the expedition for bringing Charles II. from Holland. On his return he was appointed one of the principal officers of the navy. In 1673, when the king took the admiralty into his own hands, Pepys was appointed secretary to that office, and performed his duties with great credit. During the excitement of the Popish Plot he was committed to the Tower, but was after some time discharged without a trial, and reinstated in his office at the admiralty, which he held until the abdication of James II. He died in 1703. He was president of the Royal Society for two years; but his title to fame rests upon his Diary (1659–69), which is a most entertaining work, revealing the writer's own character very plainly, giving an excellent picture of contemporary life, and of great value for the history of the court of Charles II. It is in shorthand, was discovered among a collection of books, prints, and manuscripts bequeathed by Pepys to Magdalene College, Cambridge, and was first printed in 1825.

Pera, a suburb of Constantinople (which see).

Peræ'a, a district of Palestine eastward of the Jordan, the 'Gilead' of the Old Testament.

Perak (pā'rȧk), a native state of the Malay Peninsula, extending about 80 miles along the west coast, and stretching inward to the mountain range which forms the backbone of the peninsula; area, 7949 sq. m., pop. 118,000. Since 1875 Perak has been practically a dependency of the Straits Settlements (which see), the native rajah being controlled by a British resident appointed by the governor of that colony, and English officers holding many posts under the native government. Perak is a flourishing and progressive country. Roads and railways are constructed or being made and its rich resources developed. Tin is produced in large quantities, and tapioca, pepper, rice, sugar, coffee, cacao, and cinchona are successfully cultivated. The chief town is Thaipeng, but the headquarters of the British resident are at Kwala Kangsa.

Perambulation of a Parish is made by the minister, churchwardens, and parishioners once a year, in or about Ascension week, for the purpose of preserving the boundaries.

Perception, in philosophy, the faculty of perceiving; the faculty by which we have knowledge through the medium or instrumentality of the bodily organs, or by which we hold communication with the external world. Perception takes cognizance only of objects without the mind. We *perceive* a man, a horse, a tree; when we think or feel, we are *conscious* of our thoughts and emotions. Two great disputes are connected with perception, both brought into full prominence by Bishop Berkeley. The first is the origin of our judgments of the distances and real magnitudes of visible bodies. The second question has reference to the grounds we have for asserting the existence of an external material world, which, according to Berkeley, was connected with the other. See *Idealism*.

Per'ceval, Spencer, English statesman, son of John Perceval, Earl of Egmont, born 1762, received his education at Harrow and Trinity College, Cambridge. On quitting the university he studied law. In 1801 he became solicitor-general, and in 1802 attorney-general. In 1807 he was appointed chancellor of the exchequer, and on the death of the Duke of Portland, in 1809, he became premier. In this post he continued till May 11, 1812, when a person named Bellingham shot him dead with a pistol in the lobby of the House of Commons. Perceval was a keen debater and a fluent and graceful speaker, but was shallow and intolerant, and unequal to the task of leading the councils of a great nation.

Perch, a genus of acanthopterous fishes, forming the type of the perch family (Percidæ). The common perch (*Perca fluviatilis*) is a common tenant of fresh-water lakes and rivers. The body is broad, and somewhat

Perch (*Perca fluviatilis*).

flattened laterally. There are two dorsal fins, the anterior supported by very strong spines. It is coloured a greenish-brown on the upper parts, the belly being of a yellowish or golden white. The sides are marked with from five to seven blackish bands. The average weight is from 2 to 3 lbs. The perch is a voracious feeder, devouring smaller fishes, worms, &c. The American yellow perch is one of the most common and beautiful of the fresh-water fishes of the U. States. The *Serrānus cobrilla* and

S. gigas (giant perch) are also sometimes termed 'sea-perches.' For the climbing-perch of India see *Climbing-perch.*

Perch, as a measure of length, see *Pole.*

Perchers, or PERCHING BIRDS. See *Inscssores.*

Perchlorates and **Perchloric Acid.** Perchloric acid ($HClO_4$) is prepared by the action of strong sulphuric acid upon potassium perchlorate. It is a colourless, syrupy liquid, resembling sulphuric acid. Brought into contact with organic matter it is instantly decomposed, often with explosive violence. The perchlorates have the general formula $MClO_4$, where M represents a monovalent metal, such as potassium or sodium.

Per'cidæ. See *Perch.*

Percussion, in medicine, that method of diagnosis which consists in striking gently on the surface of one of the cavities of the body, and then endeavouring to ascertain from the sound produced the condition of the organ lying beneath. Percussion is most frequently used on the chest, but it is also occasionally applied to the cavity of the abdomen, the head, &c.

Percussion Caps are small copper cylinders, closed at one end for conveniently holding the detonating composition which is exploded by percussion so as to ignite the powder in certain kinds of fire-arms. The copper cap came into general use between 1820 and 1830, and was introduced into the British army in 1840.

Percy, the name of a noble family who came to England with William the Conqueror, and whose head, WILLIAM DE PERCY, obtained thirty knights' fees in the north of England. A descendant, also named WILLIAM, who lived in the early part of the 12th century, left behind him two daughters, the elder of whom died childless, and the younger, Agnes, married Josceline of Lorain, brother-in-law of Henry I., who assumed the surname of his bride. His son, RICHARD DE PERCY, was one of the twenty-five barons who extorted Magna Charta from King John. His great-grandson, HENRY, LORD PERCY, was created Earl of Northumberland in 1337. He was Marshal of England at the coronation of Richard II., against whom, however, he took up arms, and succeeded in placing the crown on the head of the Lancastrian aspirant, Henry IV. He took up arms against this king also, but his forces were beaten at Shrewsbury (1403), where his son, Henry Percy (Hotspur), fell; and again at Barnham Moor (1407–8), where he himself fell. His titles were forfeited, but were revived in favour of his grandson HENRY, who was appointed lord high constable of England, and who fell fighting in the Lancastrian cause at St. Albans (1453). For the same cause his son and successor shared the same fate at Towton (1461). The fourth earl was murdered during a popular rising, caused by his enforcing a subsidy ordered by the avaricious Henry VII. The sixth and seventh earls fell by the hands of the executioner in the reigns of Edward VI. and Elizabeth respectively. The eighth died a violent death in the Tower, where he was confined on a charge of taking part in a plot in favour of Mary of Scotland. ALGERNON, the tenth earl, took part in the civil war against Charles I., and afterwards used all his influence to bring about the Restoration. JOSCELINE, the eleventh earl, died without male issue; his only daughter married Charles, duke of Somerset, and became the mother of ALGERNON, DUKE OF SOMERSET, who was created Earl of Northumberland, with remainder to his son-in-law, SIR HUGH SMITHSON, a Yorkshire baronet of good family. The latter succeeded to the earldom in 1750, assuming the name of Percy, and in 1766 received the ducal title. The present duke thus represents the female line of the ancient historical house.

Percy, THOMAS, Bishop of Dromore, in Ireland, was born at Bridgenorth in 1728, and graduated at Christ Church, Oxford, in 1753. In 1756 he was presented to the livings of Easton, Mandit, and Wilby, in Northamptonshire, and in 1766 he became domestic chaplain to the Duke of Northumberland. In 1769 he was appointed chaplain to the king, and in 1778 raised to the deanery of Carlisle, which he resigned four years after for the Irish bishopric of Dromore. He died at Dromore in 1811. The most popular of his works are his Reliques of Ancient English Poetry, based on an old manuscript collection of poetry, but much modernized in style. The work was published in 1765, and materially helped to give a more natural and vigorous tone to English literature, then deeply tainted with conventionalism.

Perdix, the generic name of the true partridges. The common partridge is *P. cinereus.*

Peregrine Falcon. See *Falcon.*

Perekop', a town of Southern Russia, government of Taurida, 85 miles N.N.W. of

Simferopol, on the Isthmus of Perekop, formerly a place of some military importance. The isthmus, about 20 miles long, by 4 miles wide where narrowest, connects the Peninsula of the Crimea with the mainland, and separates the Sea of Azov from the Black Sea. A ship canal is to be cut through the isthmus.

Père-la-Chaise (pār-lȧ-shāz), a famous cemetery to the north-east of Paris, opened in 1804. It occupies ground a part of which was granted to Père de la Chaise, or Chaize, confessor of Louis XIV. Its present extent is 212 acres, and it contains the burial-places of vast numbers of eminent Frenchmen.

Perennial, in botany, a term applied to those plants whose roots subsist for a number of years, whether they retain their leaves in winter or not. Those which retain their leaves are called *evergreens*, such as cast their leaves are called *deciduous*. Perennial herbaceous plants, like trees and shrubs, produce flowers and fruit year after year.

Perennibranchiata, a section of the amphibian order Urodela, in which the branchiæ or gills of early life persist throughout the entire existence of the animal, instead of disappearing when the lungs are developed. Examples are seen in the Proteus, Siren, and Axolotl. See *Amphibia*.

Pereyaslavl, an old town of Southern Russia, government of Poltava, 175 miles W.N.W. of Poltava. Pop. 9300.

Pereyaslavl-Zalyesskii, an old town of Central Russia, government of Vladimir, 87 miles north-east of Moscow. It has extensive cotton manufactures. Pop. 8700.

Perfectionists, or BIBLE COMMUNISTS, popularly named FREE-LOVERS, an American sect founded in 1838 by John Humphrey Noyes. Noyes was employed as a law-clerk at Putney, in Vermont, when the fierce religious revival of 1831 spread over the New England states, but he abandoned law for religion, and took upon himself the restoration of the primitive Christian ideal. His distinctive doctrines were—1st, reconciliation to God and salvation from sin—purely matters of faith; 2d, recognition of the brotherhood and the equality of man and woman; and 3d, community of labour and its fruits. In 1838 he succeeded in organizing a society giving expression to his views at Putney. Besides himself this included his wife, his mother, and his sister and brother, who were joined by several other families. All property was thrown into a common stock; all debts, all duties fell upon the society, which ate in one room, slept under one roof, and lived upon one common store. All prayer and religious service was stopped, Sunday was unobserved, family ties were broken up, and a complex marriage system was established, by which each man became the husband and brother of every woman; every woman the wife and sister of every man. They held that true believers are free to follow the indications of the Holy Spirit in all things, nothing being good or bad in itself. Consequently, they rejected all laws and rules of conduct except those which each believer formulated for himself; but to prevent the inconveniences arising from an ignorant exercise of individual liberty, they introduced the 'principle of sympathy,' or free public opinion, which in fact constituted the supreme government of the society. At length Putney became too warm for the Bible family to live in; the establishment was broken up; but about fifty of the picked and tried men, with as many women and children, held together. Uniting their means, they, in 1847, bought a piece of forest-land (about 600 acres) at Oneida Creek, a sequestered district in New York state, and in the course of twenty years they made it one of the most productive estates in the Union. The family or society numbered at one time over 300 members, with a branch community of 50 or 60 members at Wallingford, Connecticut. So things went on for thirty years; but the public opinion of the neighbourhood began to demand that the social practices of the society should be abandoned; and this was done in 1879, under the counsel of its founder and director, Mr. Noyes. Marriage and family life were introduced; and in 1880 communism of property gave way to joint-stock, and the society was legally incorporated as the Oneida Community, Limited. Some communistic features, however, were preserved, such as common dwellings, a common laundry, library, reading-room, &c.

Perfumes, substances emitting an agreeable odour, and used about the person, the dress, or the dwelling. Perfumes of various sorts have been held in high estimation from the most ancient times. The Egyptians, Hebrews, Phœnicians, Assyrians, and Persians are known to have made great use of them, as did also the Greeks and Romans. In the middle ages France and Italy were most conspicuous for the use and preparation of perfumes. Perfumes are partly of

animal but chiefly of vegetable origin. They may be divided into two classes, crude and prepared. The former consist of such animal perfumes as musk, civet, ambergris, and such vegetable perfumes as are obtained in the form of essential oils. The prepared perfumes, many of them known by fancy names, consist of various mixtures or preparations of odorous substances made up according to recipe. At the present time the manufacture of perfumes is chiefly carried on in Paris and London, and in various towns near the Mediterranean, especially in the south of France. Certain districts are famous for certain productions; as Cannes for its perfumes of the rose, tuberose, cassia, jasmine; Nîmes for thyme, rosemary, and lavender; Nice for the violet and mignonette. England claims the superiority for her lavender, which is cultivated upon a large scale at Mitcham in Surrey.

Per'gamus, or PERGAMUM, an ancient city in the west of Asia Minor, north of Smyrna, near the Caïcus. It was founded by emigrants from Greece, and rose to importance about the commencement of the 3d century B.C., when it was made the capital of an independent state, which subsequently became a Roman province. Under the Byzantine emperors the prosperity of the city rapidly declined. Pergamus was one of the most magnificent cities of antiquity. Many fine remains still exist in evidence of its former grandeur, and valuable results have been obtained through excavations carried out by the Prussian government. The modern town Bergama (which see) occupies its site.

Pergole'si, GIOVANNI BATTISTA, Italian musical composer, born at Jesi in 1710; studied at the conservatory of music at Naples; produced his first oratorio and his first opera in 1731; was appointed chapelmaster at Loretto in 1734; and died at Pozzuoli in March 1736. His sacred compositions and his chamber music rank high in the history of music. Among Italian composers Pergolesi is noted for the purity of his style.

Pergunnahs (PARGANÁS), THE TWENTY-FOUR, a district of India, forming the metropolitan district of the lieutenant-governorship of Bengal; area, 2128 sq. miles. They form a great alluvial plain, part of the delta of the Ganges, intersected by innumerable river-channels, creeks, and canals. Pop. (exclusive of Calcutta), 1,618,420.

Pe'rianth, in bot. the floral envelope, the calyx and corolla, or either. This term is applied when the calyx and corolla are combined so that they cannot be satisfactorily distinguished from each other, as in many monocotyledonous plants, the tulip, orchis, &c. The perianth is called *single* when it consists of one verticil, and *double* when it consists of both calyx and corolla.

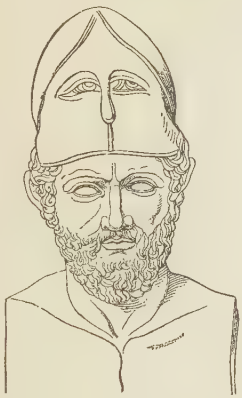
Pericardi'tis, inflammation of the membranous sac (pericardium, which see) containing the heart. In the acute stage of the disease there is exudation of lymph or serum; at a later stage false membranes are formed; and at a still later stage the two sides become glued together, forming adherent pericardium. This is generally followed by changes in the substance of the heart, or in its internal surface, orifices, or valves, and a fatal termination is rarely long delayed. The symptoms of pericarditis are: 1st, pain more or less acute, in the situation of the heart; fever is present with loss of appetite and dry tongue. An anxious respiration and a feeling of overwhelming oppression are also present, with frequent sighing, which gives momentary relief. Most of the symptoms are aggravated by motion or a high temperature. For the diagnosis of pericarditis we must rely mainly on the physical signs, but it is only when the effusion is considerable that investigation by percussion is of much use. In ordinary cases, where adhesion takes place, there may be an apparently complete recovery at the end of three weeks or less; but adhesion frequently gives rise to other structural changes of the heart, and then fatal disease of that organ almost always follows. In slight cases a real cure without adhesion may be effected. This disease is frequently brought on by exposure to cold or draughts when the body is warm and perspiring. Its most frequent occurrence is in connection with acute rheumatism.

Pericar'dium, the investing fibro-serous sac or bag of the heart in man and other animals. In man it contains the heart and origin of the great vessels. It consists of two layers, an outer or *fibrous* and an inner or serous layer. The inner surface of the membrane secretes a serous fluid, which in health is present only in sufficient quantity to lubricate the heart, and so to facilitate its movements within the sac.

Per'icarp, in botany, the seed-vessel of a plant, or the whole case or covering in which the seed is inclosed. The pericarp often consists of very distinct layers, as in the plum,

in which the external skin forms the *epicarp*, the pulp or flesh the *sarcocarp*, and the stone which encases the seed the *endocarp*. Pericarps receive such names as capsule, silique, legume, drupe, berry, nut, cone, &c.

Per'icles (-klēz), one of the most celebrated statesmen of ancient Greece, born at Athens about 494 B.C. He was connected by family relations with the aristocracy, but as Cimon was already at its head he endeavoured to gain the favour of the popular party. In this he fully succeeded by his eloquence, abilities, and political tactics, so that on the death of Cimon, in 449 B.C., Pericles became virtual ruler of Athens. By his great public works he flattered the vanity of the Athenians, while he beautified the city and employed many labourers and artists. His chief aim was to make Athens undoubtedly the first power in Greece, as well as the chief centre of art and literature, and this position she attained and held for a number of years. (See *Greece*.) At the commencement of the Peloponnesian war (B.C. 431), in which Athens had to contend against Sparta and other states, Pericles was made commander-in-chief. The Spartans advanced into Attica, but Pericles had made the rural population take refuge in Athens and refused battle. After they retired he led an army into Megaris, and next year he commanded a powerful fleet sent against the Peloponnesus. In 430 B.C. a plague broke out at Athens, and for a brief period Pericles lost his popularity and was deprived of the command. The people, however, soon recalled him to the head of the state, but amid his numerous civil cares he was afflicted by domestic calamities. Many of his friends, and his two sons, Xanthippus and Paralus, were carried off by the plague; and to console him for this loss the Athenians allowed him to legitimize his son by Aspasia. He now sunk into a lingering sickness, and died B.C. 429, in the third year of the Peloponnesian war. Pericles was distinguished by intellectual breadth, elevated moral tone, unruffled serenity, and superiority to the prejudices of his age. His name is intimately connected with the highest glory of art, science, and power in Athens.



Pericles.—Antique bust.

Per'idote, a name given by jewellers to the green transparent varieties of olivine. It is usually some shade of olive-green or leek-green. Peridote is found in Brazil, Ceylon, Egypt, and Pegu. It is a very soft gem-stone, difficult to polish, and, when polished, liable to lose its lustre and to suffer by wear.

Périer (pā-ri-ā), CASIMIR, French statesman, was born at Grenoble in 1777; educated at Lyons; and served with honour in the campaigns of Italy (1799 and 1800). In 1802 he established a prosperous banking-house in company with his brother. In 1817 he was elected to represent the department of the Seine in the Chamber of Deputies. Here he became one of the leaders of the opposition under Charles X., and was no less distinguished as the firm and eloquent advocate of constitutional principles than as an enlightened and sagacious financier. After the revolution of 1830 he was prime-minister to Louis Philippe from March 13, 1831, to his death by cholera, May 16, 1832.

Perigee (-jē), that point in the orbit of the moon which is at the least distance from the earth. See *Apogee*.

Périgord (pā-ri-gōr), an old province of France. It formed part of the military government of Guienne and Gascony, and is now represented by Dordogne and part of Lot-et-Garonne.

Périgueux (pā-ri-*geu*), a town of France, formerly capital of Périgord, now chief town of the department of Dordogne, on the right bank of the Isle, 68 miles E.N.E. of Bordeaux. There are bombazine and serge factories, iron and copper foundries, and a large trade in flour, wine, brandy, and the famous *pâtés de Périgord*. Pop. 25,313.

Perihe'lion (Greek, *peri*, near, and *hēlios*, the sun), that part of the orbit of the earth or any other planet in which it is at the point nearest to the sun. The 'perihelion distance' of a heavenly body is its distance from the sun at its nearest approach.

Perim, an island in the Strait of Bab-el-Mandeb, at the entrance to the Red Sea, about 10 miles from the Abyssinian and 1½ mile from the Arabian shore. It has been

held by Great Britain since 1857, and is under the government of Aden. It is of consequence from its commanding position, which renders it the key of the Red Sea. On its south-west side is a well-sheltered harbour capable of containing a fleet of warships. Area, 7 sq. miles; pop. (including garrison), 150.

Perim'eter, in geometry, the bounds or limits of any figure or body. The perimeters of surfaces or figures are lines; those of bodies are surfaces.

Period, in astronomy, the interval of time occupied by a planet or comet in travelling once round the sun, or by a satellite in travelling round its primary.

Periodicals, publications which appear at regular intervals, and whose principal object is not the conveyance of news (the main function of newspapers), but the circulation of information of a literary, scientific, artistic, or miscellaneous character, as also criticisms on books, essays, poems, tales, &c. Periodicals exclusively devoted to criticism are generally called *reviews*, and those whose contents are of a miscellaneous and entertaining kind *magazines;* but there is no great strictness in the use of the terms. The first periodical was published in France, being a scientific magazine, the Journal des Savants, issued in 1665, and still existing in name at least. The most famous French literary periodical is the Revue de Deux Mondes, begun in 1829, from 1831 issued fortnightly, and marked by an ability which has placed it in the front rank of the world's periodicals. Into it tales, poems, &c., are admitted, and the names of the contributors have to be attached to their articles. The earliest English periodical seems to have been the Weekly Memorials for the Ingenious, the first number of which is dated January, 1681–82, and which lasted but a year. It was followed by several other periodicals, which for the most part had but a brief existence. In the last century a number of monthly reviews appeared, including the Monthly Review (1749–1844); the Critical Review (1756–1817); the British Critic (1793–1843); the Anti-Jacobin Review and Magazine (1798–1821). At length in 1802 a new era in criticism was introduced by the Edinburgh Review, the organ of the Whigs, which came out every three months, and soon had a formidable rival in the Quarterly Review (1809), the organ of the Tories. In 1824 the Westminster Review was started by Bentham as the organ of utilitarianism and radicalism, and with it was afterwards incorporated the Foreign Quarterly Review (1827–46); and in 1836 the Dublin Review was established as the organ of the Roman Catholic party. All these quarterlies still exist as well as the London Quarterly Review (1853), the Church Quarterly Review (1875), and the Scottish Review (1882). To meet the demand for critical literature at shorter intervals than three months, there was published in 1865 the Fortnightly Review, which for about a year was true to its name, but has since appeared monthly. It was followed by the Contemporary Review (1866) and the Nineteenth Century (1877). Among the more recent periodicals of this class (in which literary criticism occupies but a small space) are the National Review (1883), a Conservative organ; Universal Review (1888), an illustrated review published in the middle of each month; the New Review, a monthly begun in 1889; and the Review of Reviews, a monthly giving extracts from all the current periodicals, begun in 1890. The Athenæum (1828), Academy (1869), Saturday Review, Spectator, Scots Observer, and Speaker (all weekly publications) combine the character of the review with more or less of that of the newspaper.

Passing over the Tatler (1709–10), Spectator (1711–12, revived 1714), &c., which may be considered to be *sui generis*, the first English magazine properly speaking may be said to be the Gentleman's Journal, or Monthly Miscellany, commenced in 1692. It was followed in 1731 by the Gentleman's Magazine, published by Cave. The success of Cave's venture brought out a host of imitators. The London Magazine (1732–84), the Scots Magazine (1739–1817), the European Magazine (1782–1826), and the Monthly Magazine (1796–1829), were among the chief of this class which were originated in the last century. In 1817 appeared the first number of Blackwood's Edinburgh Magazine, which soon distanced all its predecessors, and took rank as the best serial of the kind in Britain. Closely approaching it in point of merit stood the New Monthly Magazine, Fraser's Magazine, Tait's Edinburgh Magazine, and the Dublin University Magazine. A new era in this kind of literature was inaugurated by the shilling monthlies, some of them with excellent illustrations, the first being Macmillan's Magazine (1859), Cornhill Magazine (1860), Temple Bar (1860); closely

followed by a number of others. Another step in the direction of cheapness was shortly afterwards made by the publication of monthly magazines at sixpence, including the Argosy, Good Words, the Sunday Magazine, &c., followed at a long interval by Longman's Magazine, the Cornhill Magazine (reduced in price), the English Illustrated Magazine, Murray's Magazine, and others, some illustrated, some not. Weekly periodicals to suit the taste of all classes, at prices from a penny to threepence, have come into fashion since 1832, when the initiative was taken by the Penny Magazine and Chambers's Journal. Some of these, as Chamber's, the Leisure Hour, are now issued in monthly parts. The most popular are the North American Review (1815), now monthly, Harper's Monthly Magazine, the Atlantic Monthly, Lippincott's Magazine, Scribner's Magazine, Century Magazine, The Cosmopolitan, Belford's Magazine, Popular Science Monthly, Munsey's, Arena, Forum, Review of Reviews, McClure's.

Periodic'ity, the disposition of certain things or phenomena to recur at stated periods. It denotes the regular or nearly regular recurrence of certain phenomena of animal life, such as sleep and hunger. The first indication of a diseased state is generally a disturbance of the natural or acquired periodicity of the various functions of life.

Perios'teum, the fibrous membrane investing the bones, and which serves as a medium for the transmission of the nutritive blood-vessels of the bone. The periosteum firmly adheres to the surface of bones (including the inside of the long bones), save at their gristly or cartilaginous extremities, and it becomes continuous with the tendons or ligaments inserted into bones. When the periosteum, through disease or injury, becomes affected the blood supply and nutrition of the bone suffer, and in consequence the bone-tissue dies or becomes *necrosed*, and is exfoliated or thrown off. When a bone is fractured the periosteum plays an important part in the repair of the injury, new osseous material being deposited by the membrane.

Periosti'tis, inflammation of the periosteum, a painful ailment frequently brought on by sudden exposure to cold after being heated.

Peripatetic Philosophy, the philosophy of Aristotle and his followers, so called, it is believed, because he was accustomed to walk up and down with his more intimate disciples, while he expounded to them his doctrines (Greek, *peri*, about, *patein*, to walk). The philosophy of Aristotle starts from his criticism of the Platonic doctrine of ideas, in combating which he is led to the fundamental antithesis of his philosophy, that between matter and form. The notion or idea of a thing is not, he says, a separate existence different from the thing itself, but is related to the thing only as form to matter. Every sensible thing is a compound of matter and form, the matter being the substance of which the thing consists, while the form is that which makes it a particular thing (a stone, for example, and not a tree), and therefore the same as its notion or idea. The form is the true nature of a thing. Origination is merely matter acquiring form, it is merely a transition from potential to actual existence. Everything that actually exists previously existed potentially in the matter of which it is composed. Matter is thus related to form as potentiality to actuality. And as there is, on the one hand, formless matter, which is mere potentiality without actuality, so, on the other hand, there is pure form which is pure actuality without potentiality. This pure form is the eternal Being, styled by Aristotle the first or prime mover. The whole of nature forms a scale rising from the lower to the higher of these extremes, from pure matter to pure form, and the whole movement of nature is an endeavour (incapable of realization) of all matter to become pure form. Motion is the transition from the potential to the actual. Space is the possibility of motion. Time is the measure of motion. According to his physical conception the universe is a vast sphere in constant motion, in the centre of which is our earth. On this earth, as in all nature, there is a regular scale of beings, the highest of which is man, who, to nutrition, sensation, and locomotion, adds reason. The soul, which is merely the animating principle of the body and stands to the body in the relation of form to matter, cannot be thought of as separated from the body; but the reason is something higher than that, and as a pure intellectual principle exists apart from the body, and does not share in its mortality. Practical philosophy is divided by Aristotle into ethics, economics, and politics. According to his ethical system the highest good is happiness, which depends on the rational or virtuous activity of the soul throughout life.

Virtue is proficiency in willing what is conformed to reason. All virtues are either ethical or dianoetic. The former include justice or righteousness, generosity, temperance, bravery, the first being the highest. The dianoetic virtues are reason, science, art, and practical intelligence. For the attainment of the practical ends of life it is necessary for man to live in society and form a state.

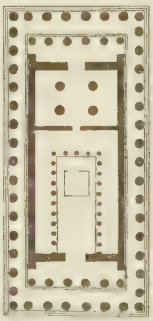
The school of Aristotle (the Peripatetic school) continued at Athens uninterruptedly till the time of Augustus. Those who proceeded from it during the first two or three centuries after his death abandoned, for the most part, the metaphysical side of Aristotle's teaching, and developed chiefly his ethical doctrines, or devoted themselves to the study of natural history. Later Peripatetics returned again to the metaphysical speculations of their master, and many of them distinguished themselves as commentators on his works. No one of the philosophical schools of antiquity maintained its influence so long as the Peripatetic. The philosophy of the Arabians was almost exclusively Aristotelianism, that of the schoolmen (scholasticism) was also based on it, and even down to modern times its principles served as the rule in philosophical inquiries.

Perip'loca, a genus of climbing plants belonging to the natural order Asclepiadaceæ, natives of South Europe and temperate and subtropical Asia, one being found in tropical Africa.

Per'iplus (Gr. 'a sailing round'), a term applied particularly to the voyage of Africaya Hanus (which see).

Peripneumonia. See *Pneumonia.*

Perip'teral, in Greek architecture, a term signifying surrounded by a row of columns: said of a temple or other building, especially of a temple the cella of which is surrounded by columns, those on the flanks (or sides) being distant one intercolumniation from the wall.



Plan of Peripteral Temple.

Pe'ris, in Persian mythology, the descendants of fallen spirits excluded from paradise until their penance is accomplished. They belong to the family of the genii or jin, and are constantly at war with the Dēvs (the evil jin). They are immortal, and spend their time in all imaginable delights. They are male and female, the latter being of surpassing beauty. Moore's Paradise and the Peri is based on this mythological notion.

Peris'sad. See *Artiad.*

Perissodac'tyla (Greek, *perissos,* odd, uneven; *daktylos,* finger or toe), one of the two great divisions of the order of Ungulata or Hoofed Quadrupeds, the animals included in which are distinguished by the fact that the toes, numbering one or three, are odd or uneven in number. This term is opposed to the Artiodactyla or 'Even-toed' Ungulata. The horse, tapir, and rhinoceros comprise the three existing genera.

Peristal'tic (or Vermicular) **Motion,** the name given to certain movements connected with digestion observed in the stomach and intestines, which proceed with a wave-like or spiral motion, the object being to gradually propel forwards the contents of these viscera.

Per'istyle, in architecture, a range of columns surrounding the exterior or interior of anything, as the cella of a temple. It is frequently but incorrectly limited in signification to a range of columns round the interior of a place, as an open court.

Peritone'um, the serous membrane lining the abdominal cavity and covering the intestines. Like all other serous membranes, the peritoneum presents the structure of a closed sac; one layer (*parietal*) lining the abdominal walls, the other or *visceral* layer being reflected over the organs of the abdomen. A cavity—the *peritoneal cavity*—is thus inclosed between the two layers of the membrane, and this contains in health a quantity of serous fluid just sufficient to moisten its surfaces.

Peritoni'tis, inflammation of the peritoneum (which see). It is either acute or chronic, and the chronic form either simple or tubercular. It may be caused by injuries such as a blow or a wound piercing the belly: is often the result of ulcerations of the stomach or bowels, and of diseases of liver, kidneys, &c., and is sometimes a grave complication of puerperal fever. The symptoms are chiefly severe pain, increased by pressure, and fever. Emollient poultices and fomentations to the abdomen when the patient is able to bear their weight, bathing in tepid water, and small doses of opium are the means of cure resorted to. Fluid food is to

be given—beef-tea, thin soup, milk, &c. For chronic cases nourishing diet is required, sea-air, friction of the belly with cod-liver oil, iodine treatment, &c.

Periwig. See *Wig.*

Periwinkle (*Vinca*), a genus of herbaceous or suffruticose plants of the natural order Apocynaceæ or Dog-bane family. The greater and lesser periwinkle (*Vinca major* and *Vinca minor*) are hardy plants, which blossom in early spring, and are pretty common in woods, hedges, and thickets in many parts of Europe and in the south of England. Their flowers are of a fine blue colour, but when cultivated in gardens they may be made to yield purple and variegated flowers, both single and double.

Periwinkle (*Littorina*), a genus of mollusca very common on the British coasts. The shell is spiral, has few whorls, and is without a nacreous lining; the aperture is rounded and entire or unnotched (holostomatous). The common periwinkle (*L. littorea*) occupies the zone between high and low water marks, and is gathered and eaten in immense quantities. It is called the *wilk* in Scotland, in some parts simply the *buckie*, but is quite different from the mollusc called *whelk* (*Buccinum*) in England.

Perjury, the act or crime of wilfully making a false oath in judicial proceedings in a matter material to the issue or cause in question. The penalties of perjury attach to wilful falsehood in an affirmation made by a Quaker or other witness where such affirmation is received in lieu of an oath. Perjury is a misdemeanour punishable in England, at common law, by fine or imprisonment, but several acts provide for additional punishment; in Scotland the punishment is penal servitude or imprisonment. In America the punishment is similar to that inflicted by the law of England. Popularly, the mere act of making a false oath, or of violating an oath, provided it be lawful, is considered perjury.

Perm, an eastern government of Russia, partly in Europe and partly in Asia; area, 128,211 sq. miles. It is traversed north to south by the Ural chain, and is well watered by rivers belonging to the Petchora, Tobol (affluent of the Obi), and Kama systems. North of the 60th degree regular culture becomes impossible, and the far greater part of the surface is occupied by forests and marshes. The government is rich in minerals, comprising iron, silver, copper, platinum, nickel, lead, and gold. There was formerly a principality of Perm, the Permians (a Finnish tribe) being under independent princes. Pop. 2,649,573.—**Perm**, the capital of the government, is situated on the Kama, 930 miles north-east of Moscow. It has flourishing industries in iron, steel, leather, &c. In the neighbourhood is a government manufactory of steel guns and munitions of war. Perm derives its commercial importance from being an emporium for the goods which are unshipped here from the steamers coming up the Kama, and despatched by rail, car, or sledge to Siberia. Pop. 32,909.

Permanent White, a white pigment consisting of sulphate of barium precipitated from the chloride by adding dilute sulphuric acid.

Perman'ganate, a compound of permanganic anhydride, Mn_2O_7, and a base. Potassic permanganate is used as a disinfectant, and as a chemical reagent.

Permian Formation, in geology, a rock formation which received its name from covering an extensive area in the government of Perm in Russia.

Permissive Bill, a bill which has been repeatedly brought before the British parliament, and whose object is to empower a majority in any locality to veto, if so pleased, the issue of all licenses for the sale of liquor in that locality. The principle of the bill is known as *Local Option* (which see).

Per'mit, a written permission given by officers of the customs or excise for conveying spirits and other goods liable to duties from place to place.

Permutations and Combinations. In mathematics, the different orders in which any things can be arranged are called their 'permutations.' The 'combinations' of things are the different collections that can be formed out of them, without regarding the order in which the things are placed. Thus the permutations of the letters *a*, *b*, *c*, taken two at a time, are *ab*, *ba*, *ac*, *ca*, *bc*, *cb*, being six in number. Their combinations, however, are only three, namely *ab*, *ac*, *bc*; and so in all cases the number of permutations exceeds the number of combinations. The theory of permutations and combinations is of some importance from its bearings on that of probabilities.

Pernambu'co, a town in Brazil, capital of the province of the same name, on the east coast. It consists of three distinct parts: Recife, occupying a small peninsula; San-Antonio, on an island; and Boa Vista, on

the mainland, the three parts being connected by iron bridges. Recife is the principal seat of business. In it are the custom-house, the exchange, a marine arsenal, &c. San-Antonio has broad streets and many fine houses, and contains the episcopal palace, the theatre, the military arsenals, &c. Boa Vista is the fashionable residential quarter. The harbour is formed by the reef, which incloses a belt of water about a mile in width. The trade is extensive. The principal exports are sugar and cotton; and the chief imports Manchester goods and hardware. Pernambuco was founded by the Portuguese in the 16th century. From 1630 to 1654 it was in the hands of the Dutch, under whom it prospered greatly. It is now the third largest city in Brazil, and the second in point of commercial importance. Pop. 130,000. — The province has an area of 49,625 square miles. The principal cultivated crops are the sugar-cane and cotton. It is chiefly the coast districts that are cultivated. The interior is either pasture-land or covered with forests yielding valuable timber, including Brazil wood, often called Pernambuco wood. Pop. 1,110,831.

Pernau, seaport town and watering-place in Russia, in the government of Livonia, at the entrance of the river Pernau into the Gulf of Riga. Pop. 12,918.

Péronne, a fortified town in France, in the department of Somme, 32 miles east by north of Amiens, on the right bank of the Somme. Pop. 4509.

Peronos'pora, a genus of fungi, one species of which, *P. infestans* (otherwise *Botrytis infestans*), is said to be the cause of the potato disease.

Pérouse, La. See *La Pérouse*.

Perox'ides, the general name applied to the binary compounds of oxygen containing the greatest amount of that element; thus of the two oxides of hydrogen, H_2O and H_2O_2, the latter is the peroxide.

Perpendic'ular, in geometry, a line falling directly on another line, so as to make equal angles on each side. A straight line is said to be *perpendicular* to a curve, when it cuts the curve in a point where another straight line to which it is perpendicular makes a tangent with the curve. In this case the perpendicular is usually called a *normal* to the curve.

Perpendicular Style, Abbey Church, Bath.

Perpendicular Style, in architecture, a variety of the pointed Gothic, the latest variety to be introduced, sometimes called the *florid* or *Tudor* style of *Gothic*. It prevailed in England from about the end of the 14th to the middle of the 16th century. It is chiefly characterized by the predominance of straight lines in the design, and especially in its tracery. Another feature is the lofty square towers of its churches, divided into stages by bands, and each stage filled with windows. The mullions of the windows are vertical, generally rise to the main arches, and are often crossed by horizontal bars or transoms. Large windows are a distinctive feature of this style. The tracery of the doors is similar to that of the windows. There are two kinds of roof peculiar to the style—the vaulted roof, with fan-tracery, and the open timber-roof. Nearly all the colleges of Oxford and Cambridge are specimens of it, and it is also exemplified more or less in many of the English cathedrals; while the majority of the old parish churches of England are also in this style.

Perpetual Motion, motion that, once originated, continues for ever or indefinitely. The problem of a perpetual motion consists in the invention of a machine which shall have the principles of its motion within itself, and numberless schemes have been

proposed for its solution. It was not till the discovery of the principle of the conservation of energy (see *Energy, Conservation of*), experimentally proved by Joule, that the impossibility of the existence of a perpetual motion was considered to be a physical axiom. This principle asserts that the whole amount of energy in the universe, or in any limited system which does not receive energy from without, or part with it to external matter, is invariable. But every machine when in action does a certain amount of work, if only in overcoming friction and the resistance of the air, and as the perpetual motion machine can start with only a certain amount of energy, this is gradually used up in the work it does. A machine, in short, would be required in which there was no friction, and which met with no resistance of any kind. The mechanical arrangements which have been put forward as perpetual motions by inventors are either, (1) Systems of weights, which are allowed to slide on a wheel into such positions relatively to the axis of the wheel as to produce a constant turning moment in one direction; (2) Masses of liquid moving in wheels on the same principle; (3) Masses of iron arranged on the same principle, but subjected to the attractions of magnets instead of their own weights. Numbers of patents for such machines are constantly being taken out, but in every case inventors show an ignorance of the most elementary principles of natural philosophy.

Perpignan (per-pēn-yăn), a city of Southern France, capital of dep. Pyrénées-Orientales, on the Têt, about 7 miles from the Mediterranean. Guarding the entrance from Spain into France by the East Pyrenees, it is strongly fortified, has a citadel and other works, and ranks as a fortress of the first class. The city has much of the Spanish character. The principal building is the cathedral, founded in the 14th century. Perpignan was formerly the capital of the county of Roussillon, was long under Spanish rule, and was not united to France till the Treaty of the Pyrenees in 1659. Pop. 29,876.

Perrault (pā-rō), CHARLES, French writer, born 1628, died 1703; superintendent of royal buildings under Colbert. His highly mediocre poem, Le Siècle de Louis le Grand (1687), gave rise to the famous controversy on the comparative merits of the ancients and moderns, and his Contes de ma Mère l'Oye have procured for him the title of 'inventor of the French Fairy Tales.'

Perry, CHARLES H. HASTINGS, musical composer, born Bournemouth, Eng., Feb. 27, 1838. Director Royal Col. of Music, London; knighted 1898. Among his noted works are: Blest Pair of Sirens; Judith, an oratario; Ode to St. Cecilia's Day; De Profundis; L'Allegro.

Perry, OLIVER H., was born in Rhode Island in 1785. In the war of 1812 he was probably the best ordnance officer in the American navy. In 1813, after a severe conflict, he forced the British squadron on Lake Erie to surrender. He died in 1819.

Perry, a fermented liquor made from the juice of pears.

Persecutions, the name usually applied to periods during which the early Christians were subjected to cruel treatment on account of their religion. Ten of these are usually counted. The *first persecution* (64–68) was carried on under Nero. The cruelties practised on this occasion are worthy of the ferocious instincts of that notorious tyrant. The apostles Peter and Paul suffered in this persecution. The *second persecution* (95–96) was raised by the Emperor Domitian. Many eminent Christians suffered; and it is generally held that St. John was exiled to Patmos at this time. The *third persecution* began in the third year of Trajan (100). This persecution continued for several years, with different degrees of severity in many parts of the empire, and the severity of it appears from the great number of martyrs mentioned in the old martyrologies. The *fourth persecution*, under Marcus Aurelius (161–180), at different places, with several intermissions and different degrees of violence, continued the greatest part of his reign. It raged with particular fury in Smyrna and Lyons, and Vienne in Gaul. Polycarp and Justin Martyr are famous victims of this period. The *fifth* began in 197 under Severus. During the *sixth persecution*, under Maximian (235–238), only Christian teachers and ministers were persecuted. Decius began his reign (249) with a persecution of the Christians (the *seventh*) throughout his dominions. This was the first really general persecution. Valerian in 257 put to death few but the clergy (*eighth persecution*); and the execution of the edict of Aurelian against the Christians (274)—the *ninth persecution*, as it was called—was prevented by his violent death. A severe persecution of the Christians (the *tenth*)

took place under the Emperor Diocletian (303). Throughout the Roman Empire their churches were destroyed, their sacred books burned, and all imaginable means of inhuman violence employed to induce them to renounce their faith. Persecutions, principally directed against the clergy, continued with more or less vigour until Constantine the Great (312 and 313) restored to the Christians full liberty and the use of their churches and goods; and his conversion to Christianity made it the established religion in the Roman Empire.

Perseph'onē (Latin, *Proserpĭna*, Anglicized *Proserpine*), in Greek mythology, the daughter of Zeus and Dēmētēr (Ceres). While she was gathering flowers near Enna in Sicily Pluto carried her off to the infernal regions, with the consent of Zeus, and made her his wife, but in answer to the prayers of Dēmētēr she was permitted to spend the spring and summer of each year in the upper world. In Homer she bears the name of Persephoneia. The chief seats of the worship of Persephonē were Attica and Sicily. In the festivals held in her honour in autumn the celebrants were dressed in mourning in token of lamentation for her being carried off by Pluto, while at the spring festivals they were clad in gay attire in token of joy at her return. In works of art Persephonē is sometimes represented as sitting by the side of her husband, and sometimes alone.

Persep'olis, a Persian city of great antiquity, famous for its magnificent ruins, situated in a fertile valley of the present prov. Farsistan. Its foundation is generally ascribed to Cyrus, but its history is involved in much doubt. It was one of Persia's capitals, and the place of burial for many of its monarchs; and it was the residence of Darius III. when it was taken in 331 B.C. by Alexander the Great, who gave it up to pillage and destruction. The remains of large marble columns, vast portals, walls, huge figures, bass-reliefs, &c., amply prove the former magnificence of its royal palace and temples.

Perseus (per'sūs), an ancient Greek hero, son of Danaë and Zeus. He was set adrift in the sea on his birth, in a chest along with his mother. But the chest reached the Island of Seriphos, and Perseus was brought up by the king of the island, who exacted a promise from him to fetch the head of the Gorgon Medusa. This he accomplished under the guidance of Hermes and Athena, and with the assistance of the nymphs. He also delivered Andromeda from a sea-monster (see *Andromeda*), an exploit which is frequently figured in ancient art. He was king of Tiryns and founder of Mycenæ. After his death Perseus was worshipped as a hero, and placed among the stars.

Perseus, the last king of the Macedonians, and an illegitimate son of Philip V., succeeded his father B.C. 178, and entered keenly into the hostilities which had previously broken out against Rome. The Romans sent an army against him and gained a signal victory at Pydna 168 B.C. Perseus fled to Samothrace, but was given up to the Romans, and some years after died in captivity at Alba, near Rome.

Perseus, a northern constellation surrounded by Andromeda, Aries, Taurus, Auriga, Camelopardalus, and Cassiopeia.

Perseverance, or FINAL PERSEVERANCE, one of the peculiar doctrines of Calvinism, which infers that after the work of salvation has actually been commenced it will be carried forward without fail to a successful termination, though by means not inconsistent with human freedom.

Persia (Persian, *Iran*), a kingdom of Western Asia; bounded north by Transcaucasian Russia, the Caspian, and Russian Central Asia; east by Afghanistan and Beloochistan; south by the Persian Gulf; and west by Asiatic Turkey; extending for 700 miles from N. to S. and 900 miles from E. to W.; area, about 636,000 sq. m.; pop. from 6,000,000 to 7,000,000. The country is divided into 27 provinces; capital Teheran (pop. 150,000 to 200,000); chief trade centres, Teheran, Tabreez, Ispahan; chief ports, Bushire and Bender Abbas on the Persian Gulf. Other large towns are: Meshed, Balfroosh, Kerman, Yezd, Hamadān, Shirāz, Kazvin, Kom, Resht.

Physical Features.—Persia may be considered as an elevated plateau, broken by clusters of hills or chains of rocky mountains, which alternate with extensive plains and barren deserts; the desert of Khorassan in the north-east alone absorbs about one-seventh of the entire area. Low tracts exist on the Persian Gulf and the Caspian. The interior plains have an elevation of from 2000 to 6000 feet above the sea. This vast central plateau is supported in the N. and S. by two great mountain chains or systems, and from these all the minor ranges seem to spring. The north chain, an extension of the Hindu Kush, enters Persia from Northern Afghan-

istan, proceeds across the country, and reaches its greatest elevation on the south of the Caspian, where it takes the name of the Elburz Mountains, and attains in Mount Demavend a height of nearly 20,000 feet. Still further west it becomes linked with the mountains of Ararat. The other great mountain system runs from north-west to south-east nearer the Persian Gulf, is of considerable width, and forms several separate ranges. In one of these an elevation of 17,000 feet is reached. The rivers are few and insignificant. Not one of them is of any navigable importance, except the Euphrates, which only waters a small portion of the south-west frontier, and the Karun, recently opened to the navigation of the world. The latter is entirely within Persian territory, and flows into the Shat-el-Arab, or united Tigris and Euphrates. Of the streams which flow northwards into the Caspian the only important one is the Kizil-Uzen or Sefid Rud (White River), which has a course of about 350 miles. There are a great number of small fresh-water lakes, and a few very extensive salt lakes, the largest being Urumiah in the extreme north-west.

Climate, Products, &c.—The climate varies considerably in different provinces, and in the central plateau intense summer heat alternates with extreme cold in winter. The shores of the Persian Gulf are scorched up in summer; those of the Caspian Sea, especially the parts covered with dense forest, are humid, but also noted for malaria. The mineral wealth of Persia is but little developed. Iron, copper, lead, antimony, are abundant; sulphur, naphtha, and rock-salt unlimited; coal also exists. The turquoise mines of Nishapur are about the only ones receiving anything like adequate attention. The interior of Persia, particularly its eastern and southern regions, is mostly devoid of vegetation over large areas; the south-west has its forests of stunted oaks and other trees, and jungle; but on the Caspian the mountain sides are covered with dense and magnificent woods of oak, beech, elm, and walnut, intermingled with box-trees, cypresses, and cedars. Lower down wheat and barley are extensively cultivated. In the level and rich plains below the sugar-cane and orange come to perfection; the pomegranate grows wild; the cotton-plant and mulberry are extensively and successfully cultivated, and large tracts are occupied by the vine, and orchards producing every kind of European fruit. In the low plains the only grain under extensive and regular culture is rice; the principal subsidiary crops are cotton, indigo, opium, sugar, madder, and tobacco. Excellent dates are produced on the southern coast tracts. Irrigation is well understood and extensively practised. The domestic animals are: sheep, chiefly of the large-tailed variety; goats, some of which produce a wool little inferior to that of Cashmere; asses and mules of a large and superior description; horses of Arab, Turkoman, and Persian breeds, and camels. Wild animals include the lion, leopard, wolf, jackal, hyena, bear, porcupine, wild ass, gazelle, &c.

Manufactures and Trade.—The manufactures of Persia were once celebrated, but excepting some carpets and shawls it may be said that the country has ceased to export manufactured articles. Its chief exports now are rice, dried fruits, opium, silk, wool, cotton, hides, pearls, and turquoises. Chief imports: textiles, china and glass, carriages, sugar, tea, coffee, petroleum, drugs, and fancy articles. The internal trade of the country is almost entirely carried on by caravans. In 1888 the first Persian railway was opened connecting the Caspian with Teheran. A projected railway includes a line from Resht to Teheran with ultimate extension to the Persian Gulf. The British trade in South Persia is estimated at about £1,000,000 annually, which does not, however, include a considerable trade with India. The total imports and exports are valued at close upon £10,000,000. There are some 4000 miles of telegraph lines in operation, and a regular postal service was organized in 1877. The principal coins of Persia are the gold *toman*, value 7*s.* 5*d.*, and the silver *krān*, value $7\frac{1}{10}d.$ The rate of exchange varies from about $33\frac{1}{2}$ to 35 krāns per £. There is no paper currency. In 1888 the Oriental Bank of London established branches at Teheran and five other chief towns.

Government.—The government of Persia is an absolute monarchy. The only control to which its ruler, the Shah, is subject are the precepts of the Koran. He surrounds himself with a certain number of advisers, forming a ministry, eleven of whom are heads of special departments. These ministers he calls and dismisses at pleasure. The revenue, chiefly derived from land and poll taxes, import and export duties, transit duties on telegrams, tributes from nomadic tribes, &c., is estimated at £1,750,000 (about

one-sixth from customs); there is no public debt. An army of some 100,000 is being reorganized under foreign officers.

People.—The population is chiefly made up of Iranians or pure Persians and Turanians (Turkish and Tartar tribes), and in religion belongs almost exclusively to the Shiah sect of Mohammedans, or more properly to a subdivision of that sect. The priesthood is very influential and very bigoted. Education is comparatively well attended to, Persia being considered, next to China, the best-educated country in Asia. The Persians are rather short and slender built, fair in complexion, hair long and straight, but beard bushy, and almost invariably jet black. The women are beautiful, intellectual, and polite. The Persian is celebrated for his affable manners, but also for his craft and deceit. Polygamy is both authorized and encouraged.

History.—The original country of the Persians occupied a small portion of modern Persia on the north of the Persian Gulf. After being under the Assyrians, and next under the Medes, Cyrus (B.C. 559–529), by conquering and uniting Media, Babylonia, Lydia, and all Asia Minor, became the founder of the Persian Empire. The empire was further extended by his son and successor Cambyses (B.C. 529–522), who conquered Tyre, Cyprus, and Egypt; and by Darius I., who subdued Thrace and Macedonia, and a small part of India. His son Xerxes (486–465 B.C.) reduced Egypt, which had revolted under his father, and also continued the war against the European Greeks, but was defeated on the field of Marathon and at Salamis (480 B.C.), and obliged to defend himself against their attacks in a disastrous war. Artaxerxes I. (B.C. 465–425) had a long and comparatively peaceful reign. Artaxerxes was followed by Darius II. or Darius Nothus, Artaxerxes II. (Mnemon), Artaxerxes III. (Ochus), and Darius III. (Codomannus, B.C. 338–330), the last of this dynasty, known as the Achæmenian dynasty. He was defeated by Alexander the Great in three battles, lost his life, and the empire passed into the hands of his conqueror. On the dissolution of the Macedonian Empire, after the death of Alexander (323), Persia ultimately fell to his general Seleucus and his successors the Seleucidæ (312). They reigned over it till 236 B.C., when the last Seleucus was defeated and taken prisoner by Arsaces I., the founder of the dynasty of the Arsacidæ and of the Parthian Empire, of which Persia formed a portion, and which lasted till 226 A.D. The supremacy was then recovered by Persia in the person of Ardishír Babigán (Artaxerxes), who obtained the sovereignty of all Central Asia, and left it to his descendants, the Sassanidæ, so called from Sassan, the grandfather of Ardishír. This dynasty continued to reign for about 417 years, under twenty-six sovereigns. The reign of Sapor II., called the Great (310–381), and that of Chosroes I. (Khosru, 531–579), were perhaps the most notable of the whole dynasty. The latter extended the Persian Empire from the Mediterranean to the Indus, from the Jaxartes to Arabia and the confines of Egypt. He waged successful wars with the Indians, Turks, Romans, and Arabs. Chosroes II. (591–628) made extensive conquests, but lost them again in the middle of the reign of the Byzantine Emperor Heraclius. His son Ardishír (Artaxerxes) III., but seven years old, succeeded him, but was murdered a few days after his accession. He was the last descendant of the Sassanidæ in the male line. Numerous revolutions now followed, until Yezdigerd III., a nephew of Chosroes II., ascended the throne in 632 at the age of sixteen. He was attacked and defeated by Caliph Omar in 639–636, and Persia became for more than 150 years a province of the Mohammedan Empire. The Arab conquest had a profound influence on Persian life as well as on the language and religion. The old Persian religion was given up in favour of Mohammedanism, only the Guebres (which see) remaining true to the faith of their fathers. About the beginning of the 9th century the Persian territories began to be broken up into numerous petty states. The Seljuks, a Turkish dynasty, who first became powerful about 1037, extended its dominions over several Persian provinces, and Malek-Shah, the most powerful of them, conquered also Georgia, Syria, and Asia Minor. Through Genghis Khan the Tartars and Mongols became dominant in Persia about 1220, and they preserved this ascendency till the beginning of the 15th century. Then appeared (1387) Timurlenk (Tamerlane) at the head of a new horde of Mongols, who conquered Persia and filled the world from Hindustan to the extremities of Asia Minor with terror. But the death of this famous conqueror in 1405 was followed not long after by the downfall of the Mongol dominion in Persia, where the Turkomans thenceforward remained masters for

100 years. The Turkomans were succeeded by the Sufi dynasty (1501–1736). The first sovereign of this dynasty, Ismail Sufi, pretended to be descended from Ali, the son-in-law of Mohammed. He assumed the title of shah, and introduced the sect of Ali (the Shiite or Shiah sect). The great Shah Abbas (1587–1628) introduced absolute power, and made Ispahan his capital. Under Shah Soliman (1666–94) the empire declined, and entirely sunk under his son Hussein. A period of revolts and anarchy followed until Kuli Khan ascended the throne in 1736 as Nadir Shah, and restored Persia to her former importance by successful wars and a strong government. In 1747 Nadir was murdered by the commanders of his guards, and his death threw the empire again into confusion. Kerim Khan, who had served under Nadir, succeeded, after a long period of anarchy, in making himself master of the whole of Western Iran or modern Persia. He died in 1779. New disturbances arose after his death, and continued till a eunuch, Aga Mohammed, a Turkoman belonging to the noblest family of the tribe of the Kajars, and a man of uncommon qualities, seated himself on the throne, which he left to his nephew Baba Khan. The latter began to reign in 1796 under the name of Futteh Ali Shah, and fixed his residence at Teheran. This monarch's reign was in great part taken up with disastrous wars with Russia and Turkey. In 1813 he was compelled to cede to Russia all his possessions to the north of Armenia, and in 1828 his share of Armenia. Futteh Ali died in 1834, leaving the crown to his grandson Mehemet Shah, during whose reign Persia became constantly weaker, and Russian influence in the country constantly greater. He died in 1848, and was succeeded by his son Nassr-ed-Din, the present shah, born 1829. He has had to suppress a number of insurrections, and in 1851 a serious rebellion of the pure Persian party in Khorassan, who refused obedience to the Kajar dynasty on religious grounds. In May 1852 he annexed the Sultanate of Herat, but was compelled to relinquish it by the British, and a second occupation in 1855 resulted in the landing of a British force on the Persian Gulf, the capture of Bushire, and the Peace of Paris (March 3, 1857). Persia has since come into the possession of portions of territory formerly belonging to Omân, Afghanistan, and Beluchistan. On the northeast the boundary between Persia and the Russian territory beyond the Caspian, after remaining long uncertain, was settled in the end of 1881, the lower course of the river Atrek, and farther east certain mountain ridges north of that river, forming the new boundary line. The shah visited the various European courts in 1873 and 1889.

Language and Literature.—Iranian is the name now usually given to all forms of the Persian language, which belongs to the great Indo-European or Aryan division of languages. The oldest form of the language is called Old Bactrian or Zend. It is that in which the Zendavesta (or sacred Zoroastrian writings. See *Zendavesta*) was originally composed, and is very closely allied to the Old Sanskrit of the Vedas. The next development of the Iranian language is the Old Persian of the cuneiform inscriptions of the Achæmenian dynasty. We then lose sight of the Iranian language, and in the inscriptions and coins of the Sassanian kings, and in the translations of the Zendavesta made during the period of their sway in Persia, we find a language called Pehlevi or Pehlvi, which is strictly merely a mode of writing Persian, in which the words are partly represented by their Semitic equivalents. This curious disguised language is also known as *Middle Persian*. *New Persian* was the next development, and is represented in its oldest form in the Shanameh of Firdusi (about 1000 A.D.). In its later form it is largely mingled with Arab words and phrases, introduced with Mohammedanism after the Arab conquest. The written character is the Arabic, but with four additional letters with three points. The Persians possess rich literary treasures in poetry, history, and geography, but principally in the former. Among the most brilliant of Persian poets are: Rudagi, a lyric and didactic poet (flourished about 952), regarded as the father of modern Persian poetry; the epic poet Firdusi (beginning of 11th century), whose most celebrated work is the poetical history the Shanameh (Book of Kings) in 6000 couplets; Omar Khayyam (died 1123), the author of celebrated 'Quatrains;' Nisâmi (12th century), a didactic poet; Sadi (13th century), a lyric and moral poet, author of the Gulistan or Rose Garden, a collection of stories; Rumi, his contemporary, a great mystic and didactic writer, &c.; Hafiz (born about the beginning of the 14th century), the most celebrated writer of odes; Jami (15th century), one the most productive and most captivating of Persian poets. (See the different articles.) In

the 16th century literary production almost ceased. Kaani, poet-laureate to the present shah, has written poetry of no little merit. The Persians are remarkable as being the only Mohammedan nation which has cultivated the drama. Their productions in this province of literature closely resemble the mysteries of the middle ages, and abound in natural and affecting lyrical passages. Not less numerous are the prose fables, tales, and narratives, many of which have been translated into English, French, German, and other European languages. It was also through the Persian that much of the Indian literature in fables and tales was transmitted to the Arabs, and thence to Europe. In the departments of history, geography, and statistics the Persians have some large and valuable works. Tabari is the earliest historian (died 922 A.D.). Mirkhond, who flourished in the 15th century, wrote a voluminous work on the History of Persia down to 1471. Geometry and astronomy were also cultivated with ardour by the Persians, but their knowledge on these subjects is in a great measure borrowed from the Arabians. Religious works are also numerous; besides those treating of Mohammed and Mohammedan religion, they have translations of the Pentateuch and the Gospels. The Persians have also translated many works belonging to old Indian literature, among others the epics Ramayana and Mahabharata, besides the abridgment of the Vedas. They have also paid great attention to their own language; of this the number of lexicographical and grammatical works extant affords abundant proof.

Persian Berries. Same as *French Berries* (which see).

Persian Gulf, a gulf separating Persia from Arabia, and communicating with the Indian Ocean by the Strait of Ormuz, 35 miles wide; greatest length, 560 miles; medium breadth, 180 miles. It receives the waters of the united Euphrates and Tigris, and of a number of small streams; the principal port is Bushire. There are many islands in the gulf; the largest are: Kishim, Ormuz, and the Bahrein Isles; in the neighbourhood of the latter there are lucrative pearl-fisheries.

Persian Powder, an efficacious insecticide introduced from the East, and prepared from the flowers of the *Pyrethrum carneum* or *roseum* (feverfew genus), nat. order Compositæ, a native of the Caucasus, Persia, &c.

Persian Wheel, or NORIA, the *Puisaro* of the south of France, a machine for raising water to irrigate gardens, meadows, &c., employed from time immemorial in Asia and Africa, and introduced by the Saracens into Spain and other European countries. It consists of a double water-wheel, with float-boards on one side and a series of buckets on the other, which are movable about an axis above their centre of gravity. The wheel is placed in a stream, the water turns it, and the filled buckets ascend; when they reach the highest point, their lower ends strike against a fixed obstacle, and the water is discharged into a reservoir. In Portugal, Spain, South of France, and Italy, this contrivance is extensively used; and has been modified to enable it to draw water also from ponds and wells, animals supplying the motive power, and pots, leather or other bags taking the place of buckets.

Persigny (per-sēn-yē), JEAN GILBERT VICTOR FIALIN, DUC DE, French statesman, born 1808, died 1872. In youth a royalist, in the army a republican, he finally became one of the staunchest and most active supporters of Napoleon III. He instigated and took part in the military rising at Strasburg in 1836, and was arrested, but escaped. In 1840 he shared Napoleon's expedition to Boulogne, was again captured, and for a time kept in confinement. On the outbreak of the revolution of February, 1848, he hastened to Paris, contributed largely to determine the vote by which Napoleon was elected president (10th Dec. 1849), and was also one of the most prominent actors in the *coup d'état* (Dec. 2, 1851), by which he became Napoleon III. He held the office of minister of the interior from 1852–54, and again from 1860–63; was appointed member of the senate 1852, ambassador to Great Britain 1855. He was elevated to the rank of duke in 1863.

Persim'mon, the fruit of the *Diospyros virginiana*, a tree (a species of ebony) inhabiting the United States of America, more especially the southern states, where it attains the height of 60 feet or more. The fruit is succulent, reddish, and about the size of a small plum, containing a few oval stones. It is powerfully astringent when green, but when fully ripe the pulp becomes soft, palatable, and very sweet.

Persis'tence, in physics, the continuance of an effect after the cause which first gave rise to it is removed; as, the *persistence* of the impression of light on the retina after the luminous object is withdrawn; the *per-*

sistence of the motion of an object after the moving force is withdrawn.

Per'sius, full name AULUS PERSIUS FLACCUS, a Roman satirical poet, was born A.D. 34 at Volterra in Etruria, and died in 62. He was well-connected; was on friendly terms with some of the most eminent men of the time, and much beloved for the purity and amenity of his manners. Six satires by him have been preserved; they are distinguished for vigour, conciseness, and austerity of tone. Dryden and Gifford, among others, have translated them into English.

Personal Actions, in law, are actions brought for the specific recovery of goods and chattels, or for the redress of breaches of contract or other injuries, in contradistinction to *real actions*, brought for the recovery of lands, tenements, and other heritable property.

Personalty, or PERSONAL PROPERTY, movables; chattels; things belonging to the person, as money, jewels, furniture, &c., as distinguished from *real* estate in lands and houses. In U. S. and England the distinction between *real* and *personal* property is very nearly the same as the distinction between *heritable* and *movable* property in the law of Scotland.

Personation. See *False Personation.*

Personification, in the fine arts, poetry, and rhetoric, the representation of an inanimate subject as a person. This may be done in poetry and rhetoric either by giving epithets to inanimate subjects which properly belong only to persons, or by representing them as actually performing the part of animated beings.

Perspec'tive, the art or science which teaches how to produce the representation of objects on a flat surface so as to affect the eye in the same manner as the object or objects themselves when viewed from a given point. Perspective is intimately connected with the arts of design, and is particularly necessary in the art of painting, as without correctness of perspective no picture can be entirely satisfactory. Perspective alone enables us to represent foreshortenings (see *Foreshortening*) with accuracy, and it is requisite in delineating even the simplest positions of objects. That part of perspective which relates to the form of the objects differs essentially from that which teaches the gradation of colours according to the relative distance of objects. Hence perspective is divided into *mathematical* or *linear perspective*, and the perspective of colour or *aerial perspective*. The contour of an object drawn upon paper or canvas represents nothing more than such an intersection of the rays of light sent from the extremities of it to the eye, as would arise on a glass put in the place of the paper or canvas. Suppose a spectator to be looking through a glass window at a prospect without, he will perceive the shape, size, and situation of every object visible upon the glass. If the objects are near the window the spaces they occupy on the glass will be larger than those occupied by similar objects at a greater distance; if they are parallel to the window, their shapes upon the glass will be parallel likewise; if they are oblique, their shapes will be oblique; and so on. As the person alters his position, the situation of the objects upon the window will be altered also. The horizontal line, or line corresponding with the horizon, will in every situation of the eye be upon a level with it, that is, will seem to be raised as far above the ground upon which the spectator stands as his eye is. Now suppose the person at the window keeping his head steady draws the figure of an object seen through it upon the glass with a pencil, as if the point of a pencil touched the object, he would then have a true representation of the object in perspective as it appears to his eye. Representations of objects have, however, generally to be drawn on opaque planes, and for this purpose rules must be deduced from optics and geometry, and the application of these rules constitutes what is properly called the art of perspective. Linear perspective includes the various kinds of *projections*. *Scenographic* projection represent objects as they actually appear to the eye at limited distances. *Orthographic* projections represent objects as they would appear to the eye at an infinite distance, the rays which proceed from them being parallel instead of converging. It is the method on which plans and sections are drawn. A *bird's-eye view* is a scenographic or orthographic projection taken from an elevated point in the air from which the eye is supposed to look down upon the objects. *Aerial perspective* teaches how to judge of the degree of light which objects reflect in proportion to their distance, and of the gradation of their tints in proportion to the intervening air. By its application each object in a picture receives that degree of colour and light which belongs to its distance from the spectator. The charm and harmony of a picture, particu-

larly of a landscape, depend greatly upon correct aerial perspective.

Perspiration, or SWEAT, the fluid secretion of special glands, the *sudoriparous* or *sweat glands* of the skin. The term perspiration is, however, sometimes used to include all the secretions of the skin, such as those of the sebaceous glands or follicles, &c. The sweat-glands, situated in the subcutaneous adipose or fat tissue of the skin, consist of a coiled-up tube, invested by a capillary net-work of blood-vessels, and continued to the surface of the skin, where it opens in an oblique valvular aperture. The openings of the sweat-ducts constitute the popular 'pores' of the skin. The largest and most numerous ducts are situated in the palm of the hand (Krause estimates 2736 to the square inch, Erasmus Wilson 3528). Perspiration is divided into *insensible* and *sensible*, the former being separated in the form of an invisible vapour, the latter so as to become visible by condensation in the form of little drops adhering to the skin. Water, fatty acids, carbonic acid, salts, &c., are removed from the body by the sweat, by which also the skin is kept moist. By the passing off of the sweat as vapour heat is lost from the body, and thus the greater or less activity of the sweat glands plays an important part in regulating the bodily temperature. For these reasons the regular process of perspiration is necessary for the preservation of good health. The constituents of sweat are to some extent dependent on the various bodily conditions and circumstances, hence the various results of analysis by different authorities. The quantity of sweat evolved from the skin has been estimated at nearly 2 lbs. daily.

Perth, a city and royal and parliamentary burgh of Scotland, capital of the county of the same name, on the right bank of the Tay, and at the common junction of railways from Dundee, Aberdeen, Glasgow, Edinburgh, and Inverness. The river and fine surrounding scenery give this city a most attractive appearance. The North and South Inches, two fine public parks extend along the river bank, and a fine bridge of nine arches leads to the suburb of Bridgend. Perth has several good streets, crossing each other nearly at right angles, and many handsome public and private buildings. St. John's Church, a Gothic building partly ancient; the Episcopal cathedral, the County Buildings, the new municipal buildings, the penitentiary or convict prison, and the railway-station, the largest in Scotland, deserve special mention. Perth is celebrated for its bleachfields and dye-works. It manufactures cotton goods, ginghams, winceys, plaids, table-linen, carriages, castings, &c. The river is navigable to the city for small vessels.—Perth is generally supposed to be of Roman origin. Its earliest known charter is dated 1106; but it was first erected into a royal burgh in 1210 by William the Lion. Till the death of James I., in 1437, it was the capital of Scotland, and both then and subsequently it became the scene of some of the most remarkable events in Scottish history. The city of Perth returns one member to the House of Commons. Pop. 30,760. —The COUNTY, which occupies the centre of Scotland, has an extreme length, east to west, of 63 miles; breadth, north to south, 60 miles; area, 1,664,690 acres, of which 32,000 are water and 349,000 acres are under cultivation. This county offers some of the finest and most diversified scenery in Scotland, some of the most fertile land in Britain, and agriculture may be seen here in a high state of perfection. The Grampians, which occupy the N. and N.W. of the county, culminate in several high peaks, including Benlawers (3984 feet), and the Ochil and Sidlaw ranges occupy the S.E. The principal rivers are the Tay, the basin of which comprises nearly the whole county; the Forth, Earn, Teith, Lyon, Garry, Tummel, &c. The chief lakes are Loch Tay, a magnificent expanse of water, 16 miles long; Loch Ericht, Loch Rannoch, and Loch Katrine. The chief agricultural district is the Carse of Gowrie, on the north bank of the Tay estuary. Sheep farming is extensively carried on. The salmon fisheries of the Tay are very valuable. The county, which formerly was divided into the districts of Athole, Breadalbane, Gowrie, Menteith, Methven, Perth, and Stormont, returns two members to the House of Commons. Principal towns: Perth, Blairgowrie, Crieff, and Dunblane. Pop. 1891, 126,128.

Perth, capital of Western Australia, on the Swan River, 12 miles above its port, Freemantle (at the mouth of the Swan River, pop. 4000). It was founded with the Swan River Settlement in 1829, is well laid out, with broad streets, and has some good buildings. Pop. 1891, 9617.

Perth Amboy, Middlesex co., N. J., on Raritan Bay, 21 m. S. W. of New York, has good harbor; fire-brick of best quality is made here. Pop. 1890, 9512.

Perth, The Five Articles of, a measure passed in a General Assembly of the Church of Scotland, convened at Perth by the order of James VI. in 1618. The first of these articles required communicants to receive the elements kneeling; the second permitted the dispensation of the communion privately in case of sickness; the third allowed private baptism on sufficient cause being shown; the fourth required that children of eight years should be confirmed by the bishop; and the fifth enjoined the observance of Christmas, Good Friday, Easter, Ascension, and Whitsunday. These articles were ratified by the Estates in 1621, but in the Assembly held at Glasgow in 1638 the assembly of Perth was declared to be unlawful and null, and the Five Articles were formally condemned.

Perthes (per'tās), Friederich Christoph, German publisher, born 1772, died 1843. After carrying on business in Hamburg for a number of years, in 1821 he removed to Gotha and founded there a prosperous publishing business, chiefly of historical and theological literature. An uncle of his, J. G. Justus Perthes, was the founder of the firm Justus Perthes of Gotha, celebrated as the publishers of the famous geographical work Petermanns Mitteilungen, and of the Almanach de Gotha.

Per'tinax, Publius Helvius, a Roman emperor, born in 126 A.D., the son of a freedman. He distinguished himself in the army, and attracted the attention of Marcus Aurelius, who elevated him to the consulate in 179. During the reign of Commodus, Pertinax was employed in Britain and Africa, and finally made prefect of Rome. After the murder of Commodus he was proclaimed emperor in 193, but in three months was murdered by the prætorian guards.

Perturbations, the orbital irregularities or deviations of the planets from their regular elliptic orbits. These deviations arise, in the case of the primary planets, from the mutual gravitations of these planets towards each other, which derange their elliptic motions round the sun; and in that of the secondaries, partly from the mutual gravitation of the secondaries of the same system, similarly deranging their elliptic motions round their primary, and partly from the unequal attraction of the sun on them and on their primary.

Peru, Miami co., Ind., on the Wabash R. R., 67 m. N. of Indianapolis. It is surrounded by a fertile country; has considerable manuf. interests. Pop. 1890, 7028.

Peru', a republic of South America, bounded on the north by Ecuador, on the west by the Pacific Ocean, on the south by Chili, and on the east by Bolivia and Brazil; area, 405,040 sq. miles; the official pop. in 1890 was 2,970,000. The population consists of about 57 per cent aboriginal Indians, 23 per cent mixed Indian races, and 20 per cent of descendants of Spaniards,

Peruvians.

Europeans (chiefly Italians, French, and Spaniards), and Asiatics (chiefly Chinese). Principal towns: Lima, the capital; Arequipa, Cuzco, and Truxillo; principal ports, Callao (port of Lima), Mollendo (port of Arequipa), and Truxillo.

Physical Features.—This country exhibits great varieties of physical character. It is traversed throughout its length by the Andes, running parallel to and on an average 60 miles distant from the coast, the region between largely consisting of sandy desert, except where watered by transverse mountain streams. The Andes consist here of two main chains or Cordilleras, connected by cross ranges, inclosing extensive and lofty valleys and plateaus. The Andes region is roughly estimated at about two-fifths of the entire area of Peru. The loftiest summits are in the southern portion of the W. Cordillera; several peaks attain there an altitude of nearly 20,000 feet, and the Chuquibamba rises to 21,000 feet. The country east of the Cordilleras, forming a part of the Amazon basin, and mostly covered by dense forest, is but little known and almost exclusively in possession of the native Indians. It is called Montaña or Los Bosques. The elevated region between the gigantic ridges of the E. and W. Cordilleras, called La-

Sierras, is now the chief, as it was anciently almost the exclusive seat, of the population of Peru. It is partly occupied by mountains and naked rocks, partly by table-lands yielding short grass, and extensive hilly pasture grounds, and partly by large and fertile valleys. The most important districts are those of Pasco, of Cuzco, the valleys of the Rio Jauja, and of the Marañon or Amazon. The first of these lies at one of those points where the branches of the Andes unite, the ridges sinking into an elevated plain, which has here a general height of 14,000 feet. The veins of the precious metals, with which this region abounds, have attracted to it a comparatively dense population. The table-land of Cuzco descends from an elevation of less than 12,000 feet in the S. to about 8000 feet in the N. Of the lakes Lake Titicaca (12,542 feet above sea-level), the largest in South America, and which partly belongs to Bolivia, is the only one of commercial importance. The chief rivers are the Marañon or main stream of the Amazon, and the Huallaga and Ucayale, which join the Marañon; the Ucayale, formed by the united waters of a number of streams (Apurimac, Urubamba, Paucartambo), being about the same size as that river. In the maritime region of Peru earthquake shocks are of common occurrence, and some of them have been of exceptional severity, the most disastrous being those of 1746, 1868, and 1877. Gold and silver occur in all the provinces of Peru, and form the chief wealth of the country. Quicksilver is also abundant. Copper, lead, and iron also exist in various places.

Climate.—The climate of Peru is as varied as its physical aspect. On a portion of the coast no rain has fallen within the memory of man, but the *garua*, a thick heavy mist often accompanied by drizzling rain, is a partial compensation, and the rivers from the Andes afford means of irrigation for sugar and cotton plantations. From November to April the sky is cloudless, and were it not for the cool oceanic currents, and the streams of cold air from the snowy Andes, the heat would be unbearable. Fortunately the rainy season in the mountains corresponds with this period. The central plateau region has a mild and comparatively humid climate, but the higher regions are inclement and subject to terrific tempests. East of the Andes the regular equatorial winds from the east come loaded with humidity, and, checked by the mountains, pour down copious, and in some places perpetual rains.

Plants and Animals.—Peru is incomparably rich in botany, each region having its own flora. In the less elevated portions of the Eastern Andes a tropical vegetation is found; while on the higher parts representatives of alpine families (as the gentians) luxuriate. In the forests of Eastern Peru cinchona trees grow abundantly and supply the valuable bark from which the quinine is extracted. The same zone, especially the hot plains and swamps, also supply coca, the medicinal properties of which have for centuries been known to the natives of Peru and Bolivia, who chew the leaves as a stimulant. Tobacco, cotton, sugar, rice, coffee, cocoa, and maize are grown in various parts and in increasing quantities. The eastern face of the Andes is as remarkable for its fauna as it is for its flora. The forests on the lower ranges and in the plains swarm with many species of parrots and monkeys; the tapir, sloth, ant-eater, armadillo, &c., are found here; the rivers are alive with alligators; and in the inundated plains the boa-constrictor attains a huge size. The puma and the South American bear inhabit the higher levels; the llama, the guanaco, the alpaca, and the vicuña, the still more elevated regions.

Commerce.—Peru exports precious metals, silver ores, guano, cubic nitre, wool of the llama, alpaca, and vicuña, cotton, sugar, cinchona bark, coca leaves and cocaine, chinchilla skins, and hides. The chief imports are machinery, cotton, woollen, and linen goods, and provisions. The trade of the country has suffered much from revolutions, and more from the disastrous war with Chili (1879–83). The export of guano and cubic nitre has naturally declined since the Chilians possessed themselves of the guano deposits of the Lobos Islands, and of the province of Tarapacá, which contains the richest nitrate beds. The total amount of the exports and imports cannot be stated, but in 1889 the exports were estimated at $6,000,000, and the imports at $5,800,000. The foreign trade is chiefly carried on with Britain and Germany. The internal trade of the country has been fostered by the construction of railways, one of which attains a height of 15,600 feet in its passage through the Andes, and exhibits remarkable engineering works. Some 2000 miles have been constructed at a cost of about $170,000,000, but only about 1500 miles are in working order. The chief denomination of money is the *sole* = about 77 cents.

Government, &c. — The government is based on a constitution adopted in 1867, and modelled on that of the United States. The legislative power is in the hands of a senate and a house of representatives, the senate being composed of two senators for each province, and the house of representatives containing one member for every 20,000 of the population. The president, elected for four years, is the executive. The estimated revenue for 1890 was $4,800,000; the expenditure $4,791,500. Peru has a foreign debt (chiefly contracted in England) amounting to $273,000,000, including unpaid interest since 1876. In 1890 this debt was settled by transfer of all the railways of the state to the bondholders. There is besides an internal debt of $65,000,000. In Peru the Indian is on a level in political rights with the white man; there exists absolute political but not religious freedom, the constitution prohibiting the exercise of any other religion than the Roman Catholic. There is, however, a considerable amount of tolerance. Education is compulsory and free; there are universities at Lima, Arequipa, and Cuzco. The Peruvian language, of which there are many dialects, still maintains itself alongside of the language of the conquerors.

History.—Of the early history of Peru we are almost entirely ignorant, but existing ruins, spoils secured by the Spaniards, and the descriptions left us by the historians of the Spanish conquest, sufficiently prove that the ancient Peruvians had no mean knowledge of architecture, sculpture, metal work, &c. They also had made considerable progress in astronomical science. The early religion of the Peruvians is bound up in the god Viracocha, the creator of the sun and the stars, and from him the Incas or emperors claimed descent as the sons of the sun. Under the Incas the empire was divided into four parts, corresponding to the four cardinal points; each division had a separate government, presided over by a viceroy of royal blood. All the land belonged to the Inca; and trade was carried on by barter, money being unknown. The thirteenth monarch of the Incas was reigning when the Spanish adventurer Pizarro disembarked in Peru in 1531. The inca was taken prisoner (1532), numbers of his subjects were massacred, and the whole country fell in a short time into the hands of the invaders. It was then formed into a Spanish viceroyalty; subsequently part of it was incorporated in New Granada, and the viceroyalty of Buenos Ayres was constructed out of some of the provinces. In 1821 the country proclaimed its independence, but did not obtain actual freedom from Spanish rule until 1824, after a prolonged war. Since then Peru, like the rest of the South American republics, has suffered much from dissensions and revolutions. In the spring of 1879 it joined Bolivia in a war against Chili, resulting in the complete defeat of both the former. Peru had to cede by the peace of 1883 the province of Tarapacá, while Chili also got possession of the department of Tacna for ten years, on the expiration of which term the inhabitants are to decide by vote whether they remain under Chilian rule or not.

Peru, La Salle co., Ill. Pop. 5550.

Peru Balsam, a resinous product obtained from certain species of *Myroxylum*, order Leguminosæ, natives of tropical America, used in medicine and perfumery. The *white Peru balsam*, a pale-yellow, transparent, and syrupy liquid, is produced from the inner coating and seed of the fruit; it hardens and becomes reddish on exposure to air, and is then called *dry*, *brown*, or *red Peru balsam*. By boiling the bark and twigs of the tree a dark-brown syrup, of vanilla-like odour, sharp and bitter taste, is obtained, the *black Peru balsam* of commerce.

Perugia (pe-rö'jà; ancient *Perusia*), a town of Central Italy, capital of the province of the same name, 84 miles north of Rome. It is beautifully situated on an eminence above the Tiber, has irregular but spacious streets, and is surrounded by old walls. It is rich in art and literary treasures, and has many remarkable buildings, including a Gothic cathedral of the 15th century, a number of churches and monasteries, a town-hall (Italian-Gothic, begun 1281), and a university, founded in 1307. The manufactures, not of much consequence, consist of velvet, silk stuffs, &c. Perugia was an old Etruscan city, and was conquered by Rome in 310 B.C. Pop. 18,711. —The province of Perugia has an area of 3719 English square miles, and is very fertile. It is traversed in all directions by offsets of the Apennines. The principal stream is the Tiber. Pop. 1891, 595,579.

Perugia, Lago di, or **Lago Trasimeno** (ancient, *Trasimēnus Lacus*), a lake in Italy, 9 miles west of Perugia, about 8 miles long, varying in breadth from 7 miles to 4 miles, surrounded with olive plantations. It con-

tains three islands, and abounds in fish. It has no visible outlet.

Perugino (per-ụ-jē'nō), PIETRO VANUCCI, surnamed *Il Perugino*, the founder of the Roman school of painting, born at Città della Pieve (a dependency of Perugia) in 1446, died at Fontignano 1523. He spent his youth, learnt his art, and lived much at Perugia (whence his surname), and at an early age distinguished himself by his works. His easel pictures were done in his earlier practice in tempera, but he afterwards became a master in the oil method. About 1480 Pope Sixtus IV. sent for him to Rome, where he was employed along with Signorelli, Ghirlandaio, Botticelli, and Rosselli in decorating the Sixtine Chapel with frescoes. Fine specimens of his frescoes are preserved in Perugia, Rome, Bologna, and Florence, and specimens of his other works are not infrequent in European galleries. Raphael is his most celebrated disciple.

Peruke. See *Wig*.

Peruvian Bark. See *Bark, Peruvian*.

Peruzzi (pā-rụt'sē), BALDASSARI, architect and painter of the Roman school, born at Sienna 1481, died at Rome 1537. He went early to Rome and was employed in the decoration of various churches. He designed the Farnesina Villa on the banks of the Tiber, and he succeeded Raphael as architect of St. Peter's. After the sack of Rome he returned to Sienna, where he was made city architect. In 1535 he was again in Rome, and henceforward devoted himself entirely to architecture. His best existing works in fresco are at Sienna.

Pes'aro (ancient, *Pisaurum*), a fortified town and seaport of Italy, province of Pesaro e Urbino, near the mouth of the Foglia, in the Adriatic. It is the see of a bishop. The harbour, formed by the mouth of the Foglia, has become shallow; but the trade in the wine, fruit (particularly figs), oil, silk, and other products of the district is considerable. The illustrious composer Rossini was born here in 1792. Pop. of town, 13,609.—The province of Pesaro e Urbino has an area of 1144 square miles. Pop. 233,155.

Peschiera (pes-ki-ā'rà), a town and fortress of Italy, 20 miles north-west of Mantua, one of the four strongholds which form the famous 'Quadrilateral.' Pop. 2962.

Pese'ta, the Spanish money unit, equivalent to a franc.

Pesha'war, a town of India, in the Punjab, capital of the division of the same name, 12 miles east of the eastern extremity of the Khyber Pass. It covers a large area, is surrounded by a mud wall, and commanded by the Bala Hissar, a fort which crowns an eminence just outside the walls. It has several good mosques, but few architectural attractions. It is favourably situated for commerce, lying in the great route from Bokhara and Cabul to India, and its proximity to the Khyber Pass makes it an important strategical point of British India, hence a British garrison is stationed here. The pop., including the military cantonment 2 miles w. of the city proper, is 79,982. The cantonment accommodates a large force, the population in it being about 20,000. The division or commissionership comprises the districts of Peshawar (area, 2504 sq. miles; pop. 592,674), Hazara, and Kohat, with the control of part of the hill tribes inhabiting the Khyber Pass. Area, 8381 sq. m.; pop. 1,181,289.

Peshi'to, or PESHITTO (that is, 'simple,' 'true,' or according to some, 'explained'), is the name given to a Syriac translation of the Old and New Testaments. Neither the time of its appearance nor its authorship are positively known. It is extremely faithful, and possesses high authority, especially in regard to the New Testament, of which it is probably the first translation that was made. Four of the catholic epistles and the Revelation of St. John are wanting.

Peso, a silver coin and money of account used in Mexico and other parts of Spanish America, and often considered equivalent to a dollar.

Pessimism, a modern term to denote the opinion or doctrine that maintains the most unfavourable view of everything in nature, and that the present state of things only tends to evil; that in human existence there is an enormous surplus of pain over pleasure, and that humanity can find real good only by abnegation and self-sacrifice. It is antithetical to *optimism*, and as a speculative theory is the work of Schopenhauer and Von Hartmann, though it is preluded in the metaphysics of Brahmanism and the philosophy of Buddhism.

Pestalozzi, JOHANN HEINRICH, a Swiss philanthropist and educational reformer, born 1746, died 1827. He first studied theology, then law; and subsequently became concerned in a calico manufactory. Afterwards he devoted his time and substance to the children of paupers, whom he collected in large numbers in his own house, and this

good work he carried on for over twenty years without outside aid or even sympathy. The want of means at last compelled him to abandon his gratuitous institution, and to seek pupils who could pay for their maintenance and instruction. After a few years' successful teaching in various places he opened a school in the Castle of Yverdun (canton Vaud), which the government had placed at his disposal. His novel Lienhardt and Gertrud (1781–89, 4 vols.) exerted a powerful moral influence, while his educational treatises have laid the foundation for the more rational system of elementary instruction which now obtains in Europe. The grand principle that lay at the basis of Pestalozzi's method was that of communicating all instruction by direct appeal to the senses and the understanding, and forming the child by constantly calling all his powers into exercise, instead of making him a mere passive recipient, selecting the subjects of study in such a way that each step should best aid the further progress of the pupil.

Pesth, or PEST. See *Budapest.*

Pestilence. See *Plague.*

Petal, an appellation given to the leaves of the corolla of plants, in opposition to those of the calyx, called *sepals.*

Pet'alite, a rare mineral, a silicate of aluminium and lithium, containing from 5 to 6 per cent of the latter. It occurs in masses of foliated structure; colour white, occasionally tinged with red, green, or blue.

Petard', a bell-shaped machine of gun-metal, and loaded with from 9 to 20 lbs. of powder. It was formerly employed to break down gates, bridges, barriers, &c.

Petau'rus. See *Flying-phalanger.*

Petcho'ra, a river of Russia, rises in the north of the government of Perm, on the western slope of the Ural Mountains, and after a course of about 900 miles falls into a bay of the Arctic Ocean by a number of mouths.

Petechiæ (pe-tek'i-ē), in medicine, a name for purple or crimson spots which appear on the skin in certain diseases.

Peter THE APOSTLE, commonly called Saint Peter, was a Galilean fisherman from Bethsaida, originally named Simon, the son of Jona, and brother of St. Andrew, who conducted him to Christ. Jesus greeted Simon with the significant words, 'Thou art Simon the son of Jona; thou shalt be called Cephas' (in Greek *Petros*, a stone, whence the name Peter). After the miraculous draught of fishes Peter became a regular and intimate disciple of our Lord. The impetuosity of his character led Peter, especially in the early days of his apostleship, to commit many faults which drew upon him the rebuke of his divine Master. His zeal and eloquence made him often the speaker in behalf of his fellow-apostles on important occasions, and his opinions had great influence in the Christian churches. On one memorable occasion he incurred the rebuke of the apostle Paul in consequence of his behaviour towards the Gentile Christians in regard to social intercourse. Nothing certain is known of his subsequent life, but it is almost beyond doubt that he was a joint-founder of the church at Rome, and that he suffered martyrdom there, most likely under Nero, about 64 A.D. The only written documents left by Peter are his two Epistles. The genuineness of the First Epistle is placed beyond all reasonable doubt, both the external and internal evidence being of the strongest description; that of the Second, however, has been disputed by numerous critics on what appears to be plausible grounds. Doubts of its genuineness already existed in the time of Eusebius, and it was not admitted into the New Testament canon till 393 A.D.

Peter THE CRUEL, King of Castile and Leon, born 1334, succeeded his father Alfonso XI. 1350, and died 1369. His reign was one long series of cruelties and despotic acts. The year following his coronation he put to death Eleanora de Guzman, his father's mistress. In 1353 he married, though contrary to his will, Blanche of Bourbon, one of the most accomplished princesses of the time, whom, however, he abandoned two days after his marriage in order to rejoin his mistress Maria Padilla. The queen was imprisoned and divorced, and his mistress's relations appointed to the highest offices. He then married the beautiful Juana de Castro, but only to abandon her after a few months. Two revolts against him were unsuccessful. On the second occasion, however, in 1366, Peter fled, and was dethroned, but he was reinstated the following year by an army lent by Edward the Black Prince. Executions and confiscations naturally followed, but these fresh cruelties only helped to swell the ranks of his opponents, of whom the chief was his half-brother Henry of Transtamara. In 1369 Henry gained a signal victory over Peter at Montiel, and the latter was slain in a sword combat with his brother.

Peter THE HERMIT, an enthusiastic monk of Amiens, whose preaching, after a pilgrimage to Jerusalem (end of the 11th century), gave rise to the first Crusade. (See *Crusades.*) Peter led the way through Hungary at the head of an undisciplined multitude of more than 30,000 men, a comparatively small number of whom survived to reach their destination, and distinguished himself by his personal courage at the storming of the holy city. On his return to his native country he founded the abbey of Noirmoutier, and died its first superior in 1115.

Peter I. (THE GREAT), ALEXEIEVITCH, Emperor of Russia, born 1672, was the eldest son by his second wife of the Czar Alexis Mikhailovitch. His elder brothers, Fedor and Ivan, were feeble in constitution. Fedor succeeded his father in 1676, and died in 1682. Ivan renounced the crown, and Peter was declared czar, with his mother, the Czarina Natalia Kirilovna, as regent. Sophia, third daughter of Alexis, ambitious to govern, succeeded in having Ivan proclaimed czar jointly with Peter, and herself regent. Peter was relegated to private life, his education purposely neglected, and his bad habits encouraged. In 1689 he wrested the power from his sister, and confined her in a convent. Peter was now virtually sole emperor, though, till the death of his brother in 1697, he associated his name with his own in the ukases of the empire. He now determined to do what he could to raise his country out of its barbarism, and to place its people in the ranks of civilized nations. His journey to Holland and England (1697–98), when he practically worked in ship-yards, is familiar; and the knowledge he there gained was amply profited by on his return. Peter, however, not only created a navy, but gave Russia a sea-board and seaports by wresting the Baltic provinces from Charles XII. of Sweden. Young Russian nobles were obliged to travel; schools of navigation and mathematics were founded; agriculture was improved by the introduction of implements, seeds, and superior breeds of cattle. Peter imported foreign artisans of all kinds, established manufactories of arms, tools, and fabrics, and distributed metallurgists through the mining districts of Russia; roads and canals were made to foster internal commerce, and to extend trade with Asia. In 1703 he laid the foundation of St. Petersburg, and twenty years later of its Academy of Sciences. Laws and institutions which in any way interfered with his projects, he either abolished or altered. In his zeal to do good he was too frequently injudicious in choosing times and seasons, and the least show of opposition irritated

Peter the Great.

him into ferocity. He repudiated his wife a few years after marriage for her reactionary leanings; for the same reason his son Alexis was ill treated, compelled to renounce the succession, and condemned to death, but died suddenly before sentence could be carried out. Peter died 28th Jan. 1725, the immediate cause being inflammation, contracted while assisting in the rescue of some soldiers in Lake Ladoga. In 1707 he had married his mistress Catharine; this marriage was publicly celebrated in 1712; Catharine was crowned in 1724, and succeeded Peter after his death. See *Catharine I.*

Peter II., ALEXEIEVITCH, Emperor of Russia, grandson of Peter the Great and son of Alexis, ascended the throne in consequence of the will of Catharine I., in 1727, when but thirteen years old. He died in 1730 of the small-pox, and was succeeded by Anna Ivanovna.

Peter III., FEODOROWITCH, Emperor of Russia, born 1728, was the son of Anna Petrovna, daughter of Peter the Great and the Duke of Holstein. Peter III. ascended the throne in 1762, but on account of his German proclivities and other causes a conspiracy broke out July 8, 1762; he abdicated on the 10th, and was murdered on the 17th of the same month. See *Catharine II.*

Pe'terborough, an episcopal city and parliamentary borough of England, partly in

Huntingdonshire, but chiefly in county Northampton, on the left bank of the Nen, 76 miles N. of London. It is an important railway and agricultural centre. The principal building is its cathedral, originally founded in 655, destroyed by the Danes in 870; rebuilt in 966, and again partly destroyed by fire in 1116. It has its present form since the commencement of the 16th century. The prevailing character of the building is Norman, but it exhibits examples of the transition, early English, decorated English, and perpendicular styles. Some alterations and restorations have recently been carried out. The bishopric was founded by Henry VIII. (1541), and his wife, Catharine of Aragon, was interred in this cathedral. Peterborough received a municipal charter in 1874. It returns one member to parliament. Pop. 1891, 25,172.

Peterborough, a flourishing town of Canada, prov. Ontario, on the river Otonabee, 26 miles north of Lake Ontario. It is well built; has manufactures of machinery, agricultural implements, &c., and being a railway centre has a good trade. Pop. 9717.

Peterborough, CHARLES MORDAUNT, EARL OF, born about 1658, succeeded his father, Lord Mordaunt, 1675, and his uncle in the earldom of Peterborough 1697. William of Orange created him Earl of Monmouth, and appointed him first commissioner of the treasury for his services in connection with the dethronement of James II. He eminently distinguished himself in Spain as a commander in the Spanish Succession war, 1705, especially by the capture of Barcelona, and received the thanks of the British parliament. He also held several diplomatic posts; was created a Knight of the Garter 1713, general of the British marine forces 1722, and died 1735 on a voyage to Lisbon.

Peterhead', a seaport in Scotland, in the county and 26 miles N.N.E. of Aberdeen, on a peninsula, near the most easterly point of Scotland, with a harbour on either side of it, communicating by a cut across the isthmus. The town is substantially built of granite, obtained from quarries in the neighbourhood, has several elegant public buildings, and a statue of Field-marshal James Keith, presented by William I., emperor of Germany. The town has a good trade, and is an important centre of the herring-fishery. The Greenland whale and seal fisheries are also important industries. Peterhead belongs to the Elgin group of parliamentary boroughs. A national harbour of refuge is in course of construction mainly by convict labour. Pop. 1891, 12,195.

Peterhof, a town in Russia, 8 miles W.S.W. of St. Petersburg, celebrated for its imperial summer palace in Versailles style, built in 1711 by Peter the Great. Pop. 14,298.

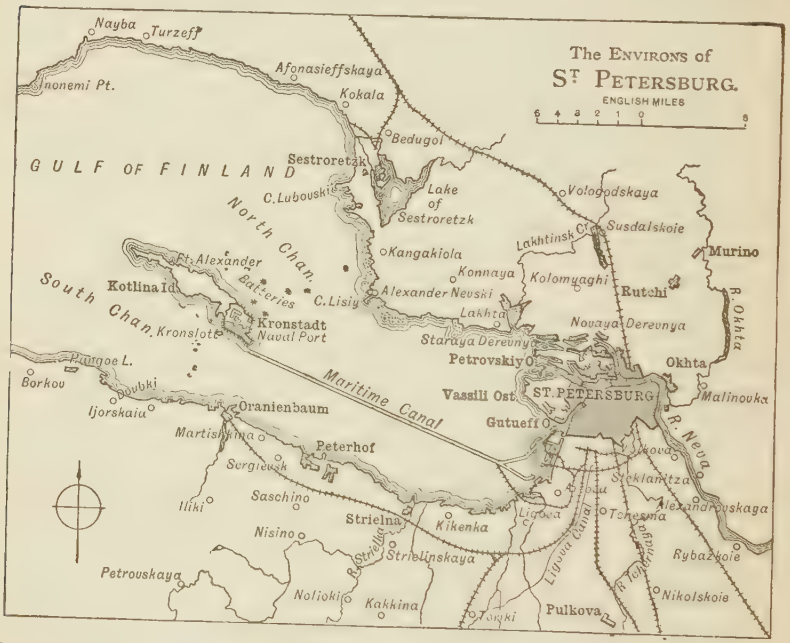
Peterloo' Massacre, the name popularly given to the dispersal of an open-air meeting of about 60,000 people, held on 16th July, 1819, in St. Peter's Field, Manchester, in favour of parliamentary reform. A number of persons were injured and eight killed. The word Peterloo is a burlesque of Waterloo.

Petermann (pā'tėr-măn), AUGUST, German geographer, born 1822, died at Gotha 1878. His first important work in cartography was a map for Humboldt's Central Asia. He afterwards assisted Keith Johnston in the preparation of his Physical Atlas; became a member of the Royal Geographical Society, and contributed to the Encyclopædia Britannica, &c. In 1854 he became professor of geography at Gotha, and superintendent of Justus Perthes' geographical establishment, editing the Mitteilungen, the foremost among geographical magazines.

Peter-port, ST., capital of the island of Guernsey, on a bay on the east side, picturesquely situated on the slope of a hill. It has a court-house and prison, a college, and the finest church in the Channel Isles. The environs are exceedingly beautiful. The harbour is large and commodious, and the roadstead affords convenient anchorage. Fort-George, a regular fortification of considerable strength, stands about ½ mile south from the town. Pop. 16,588.

Peter's, SAINT, the Cathedral of Rome, the largest and one of the most magnificent churches in Christendom. It is a cruciform building in the Italian style, surmounted by a lofty dome, built on the legendary site of St. Peter's Martyrdom. In 306 Constantine the Great erected on this spot a basilica of great magnificence. In the time of Nicholas V. it threatened to fall into ruins, and he determined on its reconstruction, but the work of restoration proceeded slowly, and Julius II. (1503–13) decided on the erection of an entirely new building. He laid the foundation-stone of the new cathedral on the 18th of April, 1506, and selected the famous Bramante as his architect. After the latter's death various architects had charge of the work until Michael Angelo was appointed in 1546. He nearly completed the

dome and a large portion of the building before his decease (1564). The nave was finished in 1612, the façade and portico in 1614, and the church was dedicated by Urban VIII. on 18th November, 1626. The extensive colonnade which surrounds the piazza and forms a magnificent approach to the church was begun by Bernini in 1667, and the sacristy erected by Carlo Marchionni in 1780. The interior diameter of the dome is 139 feet, the exterior diameter 195½ feet; its height from the pavement to the base of the lantern 405 feet, to the top of the cross outside 448 feet. The length of the cathedral within the walls is 613½ feet; the height of the nave near the door 152½ feet; the width 87½ feet. The width of the side aisles is 33¾ feet; the entire width of nave and side aisles, including the piers that separate them, 197¾ feet. The height of



the baldacchino is 94½ feet. The circumference of the piers which support the dome is 253 feet. The floor of the cathedral covers nearly 5 acres, and its cost is estimated to have exceeded £10,000,000.

Petersburg, a city and river port, Dinwiddie co., Virginia, U. States, on the Appomattox river, 23 miles s. of Richmond. It is an important railway centre, and a place of considerable trade and manufacturing industry. It was besieged by the Federal forces under General Grant in 1864–65, and the capture of this town, 'the last citadel of the Confederacy,' was soon followed by the surrender of General Lee and the end of the war. Pop. in 1890, 22,680.

Petersburg, St., the capital and most populous town of the Russian Empire, is built at the mouth of the Neva, a considerable part being on the south or left bank of the river; a small portion on the north bank; and the remainder on the numerous islands formed by the different river mouths, these various sections being connected by numerous bridges. The site is low and marshy, and liable to periodic inundations; it is also unhealthy, the death-rate largely exceeding the birth-rate. The streets are long, wide, and regular, and there are some immense squares; the public buildings are numerous, magnificent, and of colossal proportions; the quays massive and of granite. The most

important quarter is on the south side of the Neva, and is intersected by three main streets which radiate from the Admiralty Place on the river bank. Of these the chief is the Nevskoi Prospekt, a magnificent street, nearly 3 miles long and 130 feet wide. Near the Admiralty are the chief public buildings of the city. The principal churches (which are generally distinguished by prominent cupolas) are St. Isaac's Cathedral, the most costly of all, and one of the largest churches of Europe, modelled on St. Peter's, Rome, built of granite and Finland marble, and with a profusely decorated interior; the cathedral of St. Peter and St. Paul, the resting-place of the emperors, with a conspicuous pyramidal spire (302 feet); the cathedral of Our Lady of Kazan, with an image of the Virgin enriched with precious stones and pearls; the Smolni Cathedral, a white marble edifice; and the Memorial Church, built on the spot where the czar, Alexander II., was assassinated, one of the most splendid of the many sacred

St. Petersburg—St. Isaac's Cathedral and the Senate-house.

edifices in the city. Among the many palaces are the Winter Palace, now used only for ceremonial purposes, one of the largest and most luxurious in Europe; the Marble Palace so called; the Michael Palace, now used as the School of Military Engineers; and the Hermitage Palace, containing a fine library and one of the richest collections of French, Flemish, Dutch, Italian, Spanish, Russian, and other paintings, the private property of the czars, besides engravings, coins, gems, antiquities, &c. The cottage in which Peter the Great lived while superintending the construction of St. Petersburg is still preserved. Other buildings of importance are: the Admiralty, a vast parallelogram of brick, with a naval and natural history museum and library; the arsenal, containing a museum of artillery; the palaces of the general staff and of the senate; the custom-house, the exchange, and imperial bank; the fortress of Petropavlovsk (the Russian bastile); the Academy of Sciences, with extensive museum and library; and the imperial library, with over a million volumes and large collections of manuscripts and engravings. There are numerous hospitals and charitable institutions, a university, founded in 1819, many special academies, and four theatres maintained by the state. Of the monuments the colossal equestrian statue of Peter the Great, erected by Catharine II. (1782), and the monolithic Doric column of granite, 80 feet high, erected by Nicholas to the memory of Alexander I., take first rank; but these, in common with many of the finest buildings,

have severely suffered from climatic influences. St. Petersburg commands a large share of the commerce of the whole empire, but exact statistics are not obtainable. Formerly the port of the capital was at the strongly fortified island town of Cronstadt (which see), but large vessels now reach St. Petersburg by means of a deep canal, and commodious harbours have been constructed here. The manufactures are varied, but the principal are glass-works, tanneries, sugar-refineries, cotton-mills, breweries, and tobacco works; also several government establishments besides those connected with military and naval equipment, as a carpet manufactory, modelled on that of the Gobelins at Paris, and a glass and porcelain manufactory. St. Petersburg was founded by Peter the Great in 1703, when he had just wrested its site from the Swedes. The forced construction of a city in a site apparently forbidden by nature cost the lives, according to various accounts, of from 100,000 to 200,000 peasants, collected from all parts of the Russian Empire. It was at first built entirely of wood, and without a proper street system, but the extensive fires of 1736 and 1737 facilitated the reconstruction on an improved plan. The Empress Elizabeth did much to improve the city; it is, however, chiefly indebted to Catharine II. for its regularity and architectural splendour; and the improvements under Nicholas and Alexander II. have made it one of the finest of European capitals. Pop. 1890, 936,225.

Peter's (SAINT) **College**, Cambridge, or PETERHOUSE, was founded in 1257 (charter 1284) by Hugh de Balsham, bishop of Ely. Isaac Barrow, Abp. Whitgift, and the poet Gray were members of this college.

Petersfield, a former parliamentary borough in England, county of Hants, 23 miles E.N.E. of Southampton; with a fine Norman church of the 12th century. It gives name to a parliamentary division of Hants, with a pop. of 46,318. Pop. 6546.

Peter's Pence, a papal tribute collected in several of the western countries of Europe. The idea of an annual tribute seems to have originated in England before the Norman conquest, and was exacted from every householder about St. Peter's Day for the support of an English college or hospice in Rome. It was finally abolished by Elizabeth. This contribution was sometimes also called *Romescot*. It is still collected among Catholics, especially since the abolition of the pope's temporal power.

Peterwardein, a town and fortress of Hungary, on the Danube, opposite Neusatz, 45 miles north-west of Belgrade, the strongest fortress on the Danube. Pop. 3603.

Pet'iole, in botany, a leaf-stalk; the footstalk of a leaf, which connects the blade with the branch or stem.

Pétion de Villeneuve (pā-ti-on dė vēl-*neuv*), JERÔME, French revolutionary, originally an advocate at Chartres, where he was born in 1753, was chosen deputy, by the tiers-état of that city, to the states-general in 1789. In October he was made a member of the Committee of Public Safety; elected president of the National Assembly in 1790; appointed president of the criminal tribunal of Paris, and became mayor of Paris in 1791. After the death of the king he was nominated a deputy to the Convention; joined the Girondists; was impeached by Robespierre; escaped from prison, and died, it is supposed, from hunger, his body, in 1794, being found in a field in the department of the Gironde half devoured by wolves.

Petition, a representation of grievances with an appeal for redress. The first amendment to the Constitution of the United States provides that Congress shall make no law abridging the right of the people peaceably to assemble, and to petition the government for a redress of grievances. The right of petition has always been treated as an individual right, whereby the citizen can make his grievances known to the highest authority in the State or Union. In the anti-slavery agitation in the United States the right of petition was hotly contested; and it was finally decided that all petitions and memorials touching the abolition of slavery should be laid upon the table without debate. The Bill of Rights, which is a part of all State Constitutions, perpetuates the right of petition as a fundamental right incident to the relations between the government and the people.

Petition of Right, in English history, a parliamentary declaration of the rights and liberties of the people, assented to by Charles I. in the beginning of his reign (1628), and considered a constitutional document second in importance only to Magna Charta. The petition demanded: (1) that no freeman should be forced to pay any tax, loan, or benevolence, unless in accordance with an act of parliament; (2) that no freeman should be imprisoned contrary to the laws of the land; (3) that soldiers and sailors should not be billeted on private persons; (4) com-

missions to punish soldiers and sailors by martial law should be abolished.

Petitio Principii (pe-tish'ĭ-o prin-sip'ĭ-ī), in logic, a species of vicious reasoning, which consists in tacitly assuming the proposition to be proved as a premiss of the syllogism by which it is to be proved; in other words, begging the question.

Petit Jury. See *Jury*.

Petőfi (pe-*teu*'fē), Sander, a Hungarian poet, born in 1823. In his youth he was for some time a common soldier and then a strolling player; in 1843 he contributed to the journals several poems which attracted instant attention; he also wrote several dramas and novels; his lyric of Most vagy sohā (Now or Never) became the war-song (1848) of the revolution; and in recognition of his lyrical fervency he has been named 'the Hungarian Burns.' In the revolutionary war he was appointed an adjutant under Bem, and was killed in the battle of Schässburg (1849).

Petra, a ruined city, formerly the Nabathæan capital of Arabia Petræa, in a narrow valley of the Wady Musa, about 110 miles S.S.E. of Jerusalem. It appears to have been a place of considerable extent and great magnificence, for its ruins, partly temples, &c., cut out of the solid rock, cover a large space. It seems to have been the Joktheel of the Old Testament, taken by Amaziah from the Edomites.

Petrarch (pet'rärk), Francesco Petrarca, an Italian poet and scholar, born at Arezzo 20th July, 1304. His father being an exile from Florence his earliest years were spent at Incisa, in the vale of Arno, and afterwards with his father at Carpentras, near Avignon, where he began his education. He afterwards studied law at Montpellier and Bologna, but his own inclinations led him to devote his time to Latin and the Provençal poets. It was at Avignon in 1327 that he first saw, in the church of St. Claire, the Laura who exercised so great an influence on his life and lyrics. Our information regarding this lady is exceedingly meagre, but it is supposed that her name was Laura de Noves, that she had become the wife of Hughes de Sade two years before she was seen by Petrarch, and that she died in 1348 a virtuous wife and the mother of a large family. After this first meeting Petrarch remained at Avignon three years, singing his purely Platonic love, and haunting Laura at church and in her walks. He then left Avignon for Lombez (French department of Gers), where he held a canonry gifted by Pope Benedict XII., and afterwards visited Paris, Brabant, Ghent, the Rhine, &c. In 1337 he returned to Avignon, bought a small estate at Vaucluse, in order to be near Laura, and here for

Francesco Petrarca.

three years wrote numerous sonnets in her praise. It was upon his Latin scholarship, however, that he rested his hopes of fame. His Latin works were highly esteemed, and in 1341 he was called to Rome to receive the laureate crown awarded for his Latin poem of Africa, an epic on the Punic wars. At Parma he learned the death of Laura, which he recorded on his copy of Virgil, and celebrated in his Triumphs. A large part of his time was employed in various diplomatic missions, and in 1370 he took up his residence at Arqua, near Padua, where he passed his remaining years in religious exercises, dying 18th July, 1374. Among his Latin works are three books of Epistles (Epistolæ Familiares) and twelve Eclogues, his poem Africa, various philosophical, religious, political, and historical treatises; his Italian poems, on which his fame now entirely rests, chiefly consist of Sonetti and Canzoni in Vita e in Morte di Laura, and of Trionfi (Triumphs), a series of allegorical visions. His poems had an important influence on the development of Italian and modern European poetry.

Petrel, the common name of the web-footed oceanic birds of the family Procellaridæ. The petrels are nocturnal in their habits, breed in holes in the rocks, lay but one egg, and are almost all of small size

and more or less sombre plumage. The smaller species are well known to sailors under the name of Mother Carey's chickens, and their appearance is supposed to presage a storm. The term stormy petrel is more exclusively applied to the *Thalassidröma pelagica*, a bird which seems to run in a remarkable manner along the surface of the sea, where it picks up its food.

Petrifactions are the organic bodies (animal or vegetable) which have, by slow process, been converted into stone. The term is used in much the same sense as *fossils*.

Petrikau, or PETROKOFF. See *Piotrkov*.

Petrobru'sians, the followers of *Peter* (Pierre) de *Bruys*, a Provençal, who in the beginning of the 12th century preached against the doctrine of baptismal regeneration, the use of churches, altars, crucifixes, relics, &c., prayers for the dead, and the doctrine of the real presence.

Petro'leum, a variety of naphtha, called also rock or mineral oil, a liquid inflammable substance in certain localities exuding from the earth, in some places collected on the surface of the water in wells, in other places obtained in great quantities by boring. It is essentially composed of a great number of hydrocarbons; is unctuous to the touch; exhales a strong odour; flows chiefly from beds associated with coal strata; and is found in enormous quantities in various parts of the United States, Russia (especially at Baku on the Caspian), Canada, Burmah, &c. At Baku a single well is said sometimes to spout as much as 11,000 tons of oil in a single day, the oil rising perhaps to the height of 300 feet. It yields kerosene, paraffin, and paraffin oil, so extensively employed for illuminating purposes; also lubricating oil and vaseline; and has been largely employed as liquid fuel in factories, locomotives, and steamships. Steamers, specially constructed with tanks, are now engaged in its transport, and in the larger towns in England vast reservoir-tanks for its reception have been recently constructed. Attention was first strongly drawn to petroleum by the successful manufacture and sale of paraffin oil in Britain. The greatest and most remarkable development of the petroleum wealth began in 1859, when a company 'struck oil' by boring at Oil Creek, Pennsylvania, and obtained a supply of 400 gallons a day. This led to numerous other borings, and the oil was obtained in such quantities that towns of considerable size soon sprang up in the oil district, railways were constructed, immense reservoirs were made, and long lines of oil pipes laid down, while large fortunes were realized. At first the borings were not very deep, and the oil

Outburst of Petroleum in Well at Baku.

generally flowed naturally; subsequently deeper borings were necessary, and the oil could only be raised to the surface by pumping. The total oil product of the United States from 1859 to 1890, inclusive, reached the enormous amount of 384,573,605 barrels of 42 gallons each. The value of the petroleum exported averages $50,000,000 annually. See *Artesian Wells*.

Petro'nius Ar'biter, a Latin writer, notorious for his licentiousness, was born at Marseilles, and lived in the court of Nero. He is supposed by many authorities to be the author of Satyricon Libri, a work of fiction of great ability and licentiousness, of which only fragments have been preserved.

Petropavlovsk', a town and harbour of Asiatic Russia, formerly capital of Kamtchatka, on the east coast of Kamtchatka. It is now of little importance, its naval institutions having been transferred to Nikolaievsk.—Also a town of Central Asiatic

Russia, in the government of Akmollinsk, on the Ischim. Pop. 11,406.

Petrop'olis, a town of Brazil, in the province of Rio de Janeiro, and 25 miles by rail from the city of that name. Pop. about 10,000.

Petroseli'num. See *Parsley.*

Petrovsk', a town of Russia, in the government and 70 miles N.N.W. of the town of Saratov. Pop. 10,771.

Petrozavodsk', a town in Russia, capital of the government of Olonetz, on Lake Onega, 192 miles north-east of St. Petersburg. It has an important government marine and cannon foundry, and manufactures of iron and copper ware. Pop. 10,910.

Petsh, or IPEK, a town of European Turkey, in Albania, 73 miles N.E. of Scutari. Pop. about 12,000.

Pettie, JOHN, R.A., distinguished painter, born at Edinburgh in 1839; studied there at the Royal Scottish Academy; exhibited The Prison Pet (1859) at Edinburgh, and began in the following year to exhibit in London. Remarkable alike for vigorous conception and technical dexterity his historical and *genre* paintings have been numerous. Of these may be mentioned What d'ye lack, Madam (1861), The Drum-head Court Martial (1864), Arrest for Witchcraft (1866), Disgrace of Wolsey (1869), Scene in the Temple Gardens (1871), Juliet and Friar Lawrence (1874), Sword and Dagger Fight (1877), Challenged (1885), the Chieftain's Candlesticks (1886), Two Strings to her Bow (1887), The Traitor (1888), and Portraits (1889). He was elected A.R.A. in 1866, and R.A. in 1873.

Petty, SIR WILLIAM, statistician and political economist, born at Romsey, Hampshire, 1623, died 1687. He was educated in his native town and in Normandy; served for a time in the navy; studied medicine at Utrecht, Leyden, and Paris; came to Oxford, and was (1649) elected a fellow of Brasenose; became professor of anatomy (1651); and in the following year joined the army in Ireland as a physician. Here he was appointed surveyor of the forfeited Irish estates (1654), and produced the Down Survey of Irish Lands. He became secretary to Henry Cromwell, the lord-lieutenant; and in 1658 entered parliament. He wrote a Treatise of Taxes and Contributions.

Petty Bag, formerly an office in chancery in England, the clerk of which had the drawing up of parliamentary writs, writs of *scire facias*, *congés d'élire* for bishops, &c.

Pettychaps, a name given to three or four small species of warblers of the genus *Sylvia*, such as the *S. trochilus* and the *S. sibilatrix.*

Petty Officer, an officer in the royal navy whose rank corresponds with that of a non-commissioned officer in the army. Petty officers are appointed and can be degraded by the captain of the vessel.

Petty Sessions, in England, are sessions of two or more justices of the peace, on which power is conferred by various statutes to try minor offences without a jury.

Petu'nia, a genus of American herbaceous plants, nat. order Solanaceæ, nearly allied to tobacco. They are much prized by horticulturists for the beauty of their flowers.

Petuntse', PETUNTZE', the Chinese name for what is thought by geologists to be a partially decomposed granite used in the manufacture of porcelain.

Petworth-marble, also called *Sussex-marble*, from being worked at Petworth in Sussex, a variously-coloured limestone occurring in the Weald clay, and composed of the remains of fresh-water shells.

Peutingerian Table, a table of the roads of the ancient Roman world, written on parchment, and found in a library at Speyer in the 15th century. It was so named from Conrad *Peutinger*, a native of Augsburg, who was the first to make it generally known. It is supposed to have been constructed about A.D. 226.

Pew, a separate inclosed seat in a church. In England pews are held in the Established Church either by prescriptive right, or by the will of the bishop. In the United States pews are sold to actual owners, or rented to seat-holders at a fixed price.

Pewter, an alloy of tin and lead, or of tin with proportions of lead, zinc, bismuth, antimony, or copper, and used for domestic utensils. One of the finest sorts of pewter is composed of 100 parts of tin to 17 parts of antimony, while the common pewter of which beer-mugs and other vessels are made consists of 4 parts of tin and 1 of lead. The kind of pewter of which tea-pots are made (called Britannia-metal) is an alloy of tin, brass, antimony, and bismuth.

Peyer's Glands, in anatomy, the clustered glands of the intestines, first discovered by a Swiss anatomist named Peyer. See *Intestine.*

Peyrouse, LA. See *La Pérouse.*

Pézenas (pā-zē-näs), a town of France, in the department of Hérault, on the left bank

of the Hérault, at the confluence of the Peine, 25 miles W.S.W. from Montpellier. Pop. 6500.

Pez'ophaps. See *Solitaire.*

Pezop'orus. See *Parakeet.*

Pfalz (pfälts). See *Palatinate.*

Pfalzburg (pfälts'burh), a town of German Lorraine in the Vosges, 25 miles N.W. of Strasburg. It was strongly fortified by Vauban, and until 1870 (when the fortifications were razed) the town was of importance as commanding the passes of the Vosges. Pop. 3370.

Pfeffers, PFÄFFERS. See *Ragatz.*

Pfeiffer (pfi'fér), IDA, an enthusiastic traveller, born at Vienna 1797, died 1858. In her youth she was educated by her father into masculine habits and hardiness; and on the death of her husband, Dr. Pfeiffer, an advocate, she determined to gratify her love of travelling. Accordingly, she visited Turkey, Palestine, and Egypt (1842); Scandinavia and Iceland (1845); journeyed round the world in 1846–48, visiting China, India, Persia, Greece, &c.; visited California, Peru, Oregon, &c., in 1852; and in 1856 explored Madagascar. The narratives of her various journeys have been translated into English.

Pfennig, a small copper or rather bronze coin current in Germany, of which 100= 1 mark; so that ten pfennige are worth a little over an English penny.

Pforzheim (pforts'hīm), a town of the Grand-duchy of Baden, 15 miles S.E. of Carlsruhe, on the northern edge of the Black Forest, at the junction of the Nagold with the Enz. The chief industry is in the making of gold and silver trinkets, and the other manufactures are machinery, castings, tools, chemicals, leather, paper, cloth, &c. Pop. 27,200.

Phacochere (fā'ko-kēr), PHACOCHŒRE, the wart-hog of Africa, a pachydermatous mammal of the genus *Phacochœrus,* akin to the swine, characterized by a large wart-like excrescence on each side of the face. The tusks of the male project 8 or 9 inches beyond the lips, and form terrible weapons. *P. Eliani* is the Abyssinian phacochere or Ethiopian wild-boar.

Pha'cops, a genus of fossil trilobites. *P. latifrons* is characteristic of the Devonian formation, and is all but world-wide in its distribution.

Phædo, a Greek philosopher, a scholar of Socrates, and founder of a school of philosophy in Elis. The dialogue of Plato on the immortality of the soul, which contains the conversation of Socrates in prison before his death, bears the name of Phædo. None of his own writings are extant.

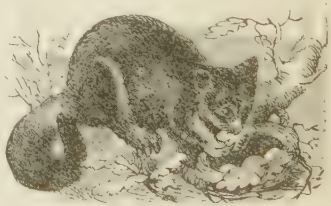
Phædra, in Greek mythology, daughter of Minos, king of Crete, was the sister of Ariadne and wife of Theseus. She falsely accused her stepson, Hippolytus, of a criminal attempt upon her honour, an injustice of which she afterwards repented, and was either killed by her husband or committed suicide. Sophocles and Euripides made this the subject of tragedies (both of which are lost), and their example was followed by Racine.

Phædrus, a Latin writer of the Augustan age, who translated and imitated the fables of Æsop. He was a slave brought from Thracia or Macedonia to Rome, and manumitted by Augustus. Some authorities have doubted the genuineness of the fables ascribed to Phædrus, but their style is favourable to the supposition of their genuineness. There are five books containing ninety-seven fables attributed to him, besides certain others.

Pha'ëthōn, a mythological character, who one day obtained leave from his father Helios (the Sun) to drive the chariot of the sun, but being unable to restrain the horses Zeus struck him with a thunderbolt and hurled him headlong into the river Po. The name in its English form of *Phœton* is applied to an open four-wheeled carriage.

Phagedæna (faj-e-dē'na), in medicine, a name given to a kind of obstinate gangrenous ulcer which eats into or corrodes the adjoining parts.

Phal'anger, the name given to the animals of the genus *Phalangista,* a genus of



Vulpine Phalanger (*Phalangista vulpina*).

marsupial quadrupeds inhabiting Australasia; also called *phalangists.* They are generally of the size of a cat, are nocturnal in their habits, and live in trees, feeding on insects, fruits, leaves, &c. The sooty phalanger or tapoa (*P. fuliginōsa*), so called from its colour, is pretty common in Tasmania.

The vulpine phalanger or vulpine opossum (*P. vulpīna*) is another species, common in Australia. See also *Flying Phalanger.*

Phalan'ges (-jēz), the name applied to the separate bones of which the digits (or fingers and toes) of vertebrates are composed. Each digit or finger of the human hand consists of three phalanges, with the exception of the pollex or thumb, which is composed of two only.

Phalansterianism, PHALANSTERISM. See *Fourier.*

Phal'anx, a name given generally by the Greeks to the whole of the heavy-armed infantry of an army, but more specifically to each of the grand divisions of that class of troops when formed in ranks and files close and deep, with their shields joined and their pikes crossing each other. The Spartan phalanx was commonly 8 feet deep, while the Theban phalanx was much deeper.

Phal'aris, a ruler of Agrigentum in Sicily (probably between 571 and 549 B.C.), chiefly celebrated in tradition for his cruelty. He is said to have burned his victims in a brazen bull, within which a slow fire was kindled. By means of pipes fitted in its nostrils the shrieks of the tyrant's victims became like the bellowing of the animal. The letters of Phalaris, of which an English edition was published in 1695, were shown to be spurious by Richard Bentley in his Dissertation on Phalaris (1699). See *Bentley.*

Phal'aris, a small genus of grasses, of which the seed of one of the species, *P. canariensis,* or canary-grass, is extensively employed as food for birds, and commonly known as canary-seed.

Phalarope (fal'a-rōp), the common name of several grallatorial birds forming the genus *Phalarŏpus.* The gray phalarope (*P. lobātus*), frequently seen in Britain in the course of its migration from its arctic breeding place to its southern winter quarters, is a beautiful bird, rather over 8 inches long, with a short tail and slender straight bill. The red-necked phalarope (*P. hyperborĕus*), which breeds in some of the most northern Scottish islands, is rather smaller than the gray phalarope.

Phallus, the emblem of the generative power in nature, carried in solemn procession in the Bacchic orgies of ancient Greece (see *Bacchanalia*), and also an object of veneration or worship among various Oriental nations. (See *Lingam.*) In botany, *Phallus* is a genus of fungi of the division Gasteromycetes. The most common British species is *P. impudīcus* or *fœtidus,* popularly called *stinkhorn,* which has a fœtid and disgusting smell.

Phaneroga'mia, a primary division of the vegetable kingdom, comprising those plants which have their organs of reproduction (stamens and pistils) developed and distinctly apparent. See *Botany.*

Phantasmago'ria, a term applied to the effects produced by a magic-lantern.

Pharaoh (fā'rō), the name given in the Bible to the kings of Egypt, corresponding to the P-RA or PH-RA of the Egyptian hieroglyphics, which signifies the sun. The identification of the Pharaohs mentioned in Scripture with the respective Egyptian kings, particularly the earlier ones, is a matter of great difficulty. See *Egypt.*

Pharaoh's Rat. See *Ichneumon.*

Pharisees, a religious sect among the Jews which had risen into great influence at the time of Christ, and played a prominent part in the events recorded in the New Testament. The most probable account of the origin of the Pharisees as a distinct sect is that which refers it to the reaction against the attempt of Antiochus Epiphanes to break down the distinctions between his Jewish and his Greek subjects. At the time of Christ the Pharisees stood as the national party in politics and religion—the opponents of the Sadducees. The fundamental principle of the Pharisees was that of the existence of an oral law to complete and explain the written law. 'Moses,' says the Mishna, 'received the law (the unwritten law is meant) from Sinai, and delivered it to Joshua, and Joshua to the elders, and the elders to the prophets, and the prophets to the men of the Great Synagogue.' This oral law declared the continuance of life after the death of the body, and the resurrection of the dead. This authoritative tradition received in process of time additions which were not pretended to be derived directly from Moses:—1st. Decisions of the Great Synagogue by a majority of votes on disputed points. 2d. Decrees made by prophets and wise men in different ages. 3d. Legal decisions of proper ecclesiastical authorities on disputed questions. These authorities comprehended both the writers of the sacred books and their approved commentators. There is no doubt that, though their strict observance of small points often led to hypocrisy and self-glorification, the sect contained a body of pious, learned, and patriotic men of progress.

Pharmacopœ'ia (Greek, *pharmakon*, drug, *poiia*, making), a book containing the prescriptions for the preparation of medicines recognized by the general body of practitioners. Up till 1863 separate Pharmacopœias were issued by the Colleges of Physicians of London, Edinburgh, and Dublin. Since then a British Pharmacopœia, issued by the medical council of the kingdom, is recognized by the whole medical profession of Great Britain. There is also an American pharmacopœia, based on that of Britain.

Phar'macy, PHARMACEUTICS (Greek, *pharmakon*, drug, *pharmakeuein*, to administer drugs), the art of preparing, compounding, and combining substances for medical purposes; the art of the apothecary. As these substances may be mineral, vegetable, or animal, theoretical pharmacy requires a knowledge of botany, zoology, and mineralogy; and as it is necessary to determine their properties, and the laws of their composition and decomposition, of chemistry also. In a narrower sense pharmacy is merely the art of compounding and mixing drugs according to the prescription of the physician. (See *Apothecary* and *Chemists.*) In pharmaceutical operations the apothecaries' weight is used, in which 20 grains make a scruple, 3 scruples a drachm, 8 drachms an ounce, and 12 ounces a pound; in fluid measure 60 minims (drops) make 1 fluid drachm, and 8 drachms a fluid ounce. The following abbreviations and signs are used by physicians in writing their prescriptions:—℥, ounce; ʒ, drachm; ℈, scruple; f. ʒ, fluid ounce; f. ʒ, fluid drachm; ♏, minim; Gut. (*gutta*), drop; Cochl. (*cochleāre*), spoonful; j. or i., one; ss., half; āā or ana, of each; q. s. (*quantum sufficit*), as much as necessary; p. e., equal parts.

Phar'naces, a king of Pontus overthrown by Cæsar in 47 B.C., a victory announced in the famous message sent to Rome: *Veni, vidi, vici.*

Pharo, a game. See *Faro.*

Pharos, a lighthouse. The name is derived from the island of Pharos, close to and now part of Alexandria, which protected the port of that city. On the eastern promontory of the island stood the lighthouse of Alexandria, so famous in antiquity, and considered one of the wonders of the world, built 300 years B.C. See *Lighthouse.*

Pharsa'lus, a town of ancient Thessaly, near which Cæsar defeated Pompey B.C. 48. (See *Cæsar* and *Pompey.*) It is now represented by the small town Phersala, seat of a Greek archbishop. Pop. 1363.

Pharyngobranchii (fa-rin-go-brang'ki-ī; 'pharynx-gilled'), the name applied to the lowest order of fishes, represented solely by the lancelet (which see).

Pharyngognathi (fa-rin-gog'na-thī), a tribe of acanthopterous fishes, which includes the wrasses, the parrot-fishes, the garfish, saury-pikes, and flying-fish.

Pharynx (fa'ringks), the term applied to the muscular sac which intervenes between the cavity of the mouth and the narrow œsophagus, with which it is continuous. It is of a funnel shape, and about 4 inches in length; the posterior nostrils open into it above the soft palate, while the larynx, with its lid, the epiglottis, is in front and below. The contraction of the pharynx transmits the food from the mouth to the œsophagus. From it proceed the eustachian tubes to the ears.

Phascog'ale, a genus of small marsupials, closely allied to the dasyures, found throughout Australia, New Guinea, &c.

Phascolarc'tos. See *Koala.*

Phascol'omys, the generic name of the wombat (which see).

Phase, in astronomy, one of the recurring appearances or states of the moon or a planet in respect to quantity of illumination, or figure of enlightened disc.

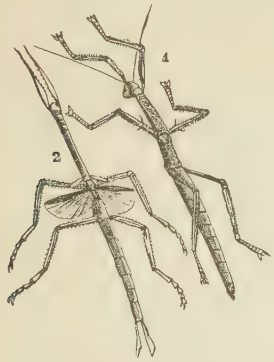
Phase'olus, the genus of leguminous plants to which belong the kidney-bean and scarlet-runner. See *French Bean.*

Phasian'idæ, PHASIA'NUS. See *Pheasant.*

Phasis, a river of Colchis (Transcaucasia), now called the Rion, anciently regarded as the boundary between Europe and Asia. It rises in a spur of the Caucasus, flows in a generally western direction, and falls into the Black Sea near Poti. Pheasants are said to have been first brought to Europe from the banks of this river, hence their name.

Phas'midæ, spectre insects or walking-sticks, a family of orthopterous insects allied to the Mantidæ, restricted to warm countries, and remarkable for their very close resemblance to the objects in the midst of which they live, this peculiarity, known as *mimicry*, being their only protection against their enemies. The family includes the genera *Phasma*, *Phyllium*, *Cladomorphus*, &c. Some of them are destitute of wings, and have the appearance of dead twigs, while the absence of motion in the insects adds to the deception. In others, as the genus *Phyllium*, the wings have the appear-

ance of withered leaves, while the brighter hue of the wing-covers of a few of larger



Phasmidæ, or Spectre Insects.

1, *Cladomorphus phyllinus* (Brazilian Walking-stick). 2, *Acrophylla chronus*, Australia.

size give to the animal the appearance of a fresher leaf.

Pheasant, the general name given to birds of the family Phasianidæ, which comprises several genera besides that of the pheasants proper, *Phasiānus*. There are usually naked spaces of skin on the head or cheeks and often combs or wattles. The plumage of the males is brilliant, that of the females more sober, and the males carry spurs on the tarso-metatarsus. The wings are short, the tail long. The three front toes are united by

Golden Pheasant (*Thaumalea picta*).

a membrane up to the first joint, and the hinder toe is articulated to the tarsus. The food consists of grains, soft herbage, roots, and insects. They are chiefly terrestrial in habits, taking short rapid flights when alarmed. The pheasants are polygamous, the males and females consorting together during the breeding-time, which occurs in spring. The common pheasant (*Phasianus Colchicus*), now fully domesticated in Britain, but originally said to be a native of the banks of the Phasis in Western Asia, is the familiar species. It extends in its distribution over Southern Europe, and is said even to exist in Siberia. These birds breed freely in a domesticated state. The pheasant will interbreed with the common fowl, the Guinea fowl, and even with the black grouse; and there are white and pied varieties of the common species. The hybrid produced by the union of a cock-pheasant with the common hen is termed a *pero*. Other species inhabiting Southern Asia and the Eastern Archipelago are the Diard's pheasant of Japan (*P. versicolor*); Reeve's pheasant (*P. veneratus*) of China; and Sömmering's pheasant (*P. Sömmeringii*), found in Japan. There are various others often put in different genera, as the firebacks, birds of rich plumage, natives of Siam and the adjacent islands; the silver pheasants (genus *Euplocămus*), of China, Burmah, and various parts of India, with a generally white plumage, the feathers marked with fine black lines; the golden pheasant of Tibet and China, the type of the genus *Thaumalea*. It is noted for its brilliant colours and magnificent crest. See also *Argus Pheasant*, *Impey Pheasant*, *Tragopan*.

Pheasant's Eye. See *Adonis*.

Pheasant Shell (*Phasianella*), a genus of gasteropodous mollusca, found in South America, India, Australia, the Mediterranean, &c. The shell is spiral and obovate, the outside polished and richly coloured.

Phelps, Samuel, actor, born in Devonport 1806, died 1878. He was apprenticed to a printer, but took to the stage in 1827, and ten years later was appearing in London in leading Shaksperian characters, and was one of the leading performers under Macready at Covent Garden. From 1844 to 1862 he directed Sadler's Wells Theatre. He was regarded as the most accomplished Shaksperian actor of his day, excelling more especially in comedy parts such as Bottom, Justice Shallow, &c. He published a scholarly edition of Shakspere in 1853.

Phenic Acid, Phenol. See *Carbolic Acid*.

Phenom'enalism, that system of philosophy which inquires only into the causes of existing phenomena. The sceptical phenomenalism of Hume is now represented by *Positivism*. A phenomenalist does not believe in an invariable connection between cause and effect, but holds this generally acknowledged relation to be nothing more than a habitually observed sequence.

Phenyl'amine. Same as *Aniline.*

Pheræ, an ancient city of Thessaly, which under the rule of tyrants of its own became a controlling power of the whole of Thessaly, and for long made its influence felt in the affairs of Greece. In 352 B.C. it became subject, with the rest of Thessaly, to Philip of Macedon.

Pherecydes (fer-i-sī'dēz), a Greek philosopher of the 6th century B.C., a native of the island of Syros, and a contemporary of Thales. He is said to have taught the doctrine of metempsychosis, or of the immortality of the soul, and to have been the instructor of Pythagoras. Some fragments of his work are extant.

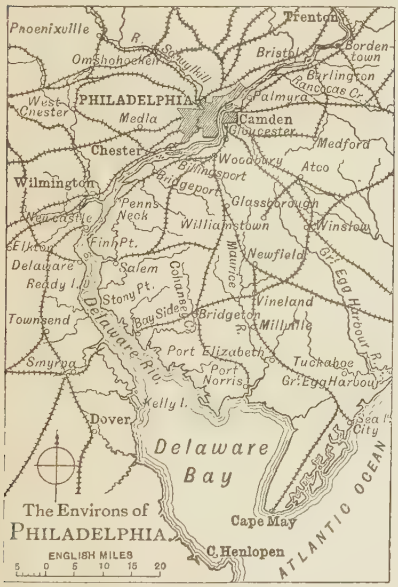
Phi'dias OF ATHENS, a celebrated Greek sculptor, who was born about 490 B.C., and flourished in the age of Pericles, but of whose life hardly any particulars are known. Among his works were three statues of Athena which were all in the Acropolis of Athens in the time of Pausanias. One colossal statue of Athena was in bronze, and the goddess was represented as a warrior-goddess in the attitude of battle. The second and still more famous stood in the Parthenon, and was made of ivory and gold, representing Athena standing with a spear in one hand and an image of Victory in the other; it measured, with the pedestal, about 41½ feet in height. The third statue, in bronze, of a smaller size, was called emphatically the *beautiful*, on account of its exquisite proportions. Another colossal statue by Phidias, that of Zeus at Olympia, was ranked for its beauty among the wonders of the world. Zeus was here seen sitting upon a throne, with an olive wreath of gold about his temples; the upper part of his body was naked; a wide mantle, covering the rest of it, hung down in the richest folds to his feet, which rested on a footstool. The naked parts of the statue were of ivory, the dress was of beaten gold. The right hand held a Victory, and the left a sceptre tipped with the eagle. The Zeus was removed to Constantinople by Theodosius I., and was destroyed by fire in 475 A.D. During the government of Pericles, which lasted twenty years, Athens was adorned with costly temples, colonnades, and other works of art. Phidias superintended these improvements; and the sculptures with which the Parthenon, for instance, among other buildings, was adorned, were partly his own work, and partly in the spirit and after the ideas of this great master. Of the merits of these we can ourselves judge. (See *Elgin Marbles, Parthenon.*) Phidias received great honours from the Athenians, but he is also said to have been falsely accused of peculation, and of impiety for putting his own likeness and that of Pericles on the shield of Athena. He died probably about B.C. 432.

Phigali'a, a city of ancient Greece in the most mountainous part of Arcadia. On one of the mountains, Mount Cotylium, to the north-east of the site of Phigalia, is situated the temple of Apollo Epicurius, built in the time of the Peloponnesian war by Ictinus, the architect of the Parthenon at Athens, and still one of the best-preserved temples in Greece. The frieze, which was usually on the exterior of the temple, was here in the interior, and with the metopes was of Parian marble. It is now in the British Museum, and is quite complete, consisting of 23 slabs of marble 2 feet high, carved in high relief, the whole being 101 feet long. The subjects are the battle of the Lapithæ and the Centaurs, and that between the Amazons and the Greeks, the school being that of Phidias.

Philadelphia, (1) an ancient city of Palestine, east of the Jordan, originally Rabbath-Ammon, the ancient capital of the Ammonites. (2) An important city in the east of Lydia. See *Ala-Shehr.*

Philadelphia, a city and river port of the United States, in Pennsylvania, ranking the third largest city in the Union, 136 miles north-east of Washington and 97 miles south-west of New York, situated on the rivers Delaware and Schuylkill, and, following the course of Delaware Bay and River, 96 miles from the Atlantic coast. The site is nearly flat, but slopes gently both towards the Delaware and the Schuylkill. The houses are generally built of brick, the private houses having in many cases dressings of white marble. The streets were originally laid out so as to run nearly due westward from the Delaware, intersected by other streets running nearly north and south, and still almost everywhere the streets cross each other at right angles. Market Street, the great central street running east and west, and continuously built upon for over 5 miles, has a width of 100 feet; Broad Street, the principal central street running north and south, is built upon to about the same length, and is 113 feet in width. Most of the other chief streets vary from 50 to 66 feet broad, some of the avenues, however, being much wider. At the intersection of some are fine squares. The prin-

cipal thoroughfares are laid with the lines in connection with an efficient trolley system. Fine bridges, for railway and general traffic, span the Schuylkill and Delaware, and a regular service of steam-ferries across the latter affords communication



with the shores of New Jersey. Among the notable public buildings are the State House, containing a large room called Independence Hall, from the circumstance that the Declaration of Independence was signed here (4th July, 1776); the custom-house, a white marble edifice; the United States mint, a marble-fronted building; the new post-office, a large and handsome granite structure with a dome; the new city-hall having an elevation of 337 feet, above which is a dome two hundred feet high, surmounted by a statue of Penn; Girard College, a fine example of the Corinthian style; the buildings of the Pennsylvania University; the Memorial and Horticultural Halls in Fairmount Park, erected in 1876, for the Centennial Exhibition, and still retained; the splendid building accommodating the Academy of Fine Arts; many handsome churches, banks, insurance offices, &c. Charitable institutions are numerous and efficient. The educational establishments include the Pennsylvania University; the Jefferson Medical College; University Medical College; the Women's Medical College; the Academy of Fine Arts; the School of Design for Women; the Academy of Natural Sciences; the Franklin Institute; numerous colleges, academies, and other educational institutions, supported by the various religious denominations; the Girard College, devoted to the secular education of orphan boys; and the public schools. Many of the above institutions possess extensive and valuable libraries, in addition to which are the large collections belonging to the Library Company, and to the Mercantile Library; and Philadelphia is one of the recognized centres of literary, dramatic, and artistic culture. In addition to the public squares the chief place of outdoor recreation is Fairmount Park, with an area of 2740 acres, possessing much natural beauty, being well-wooded and having a great variety of surface. The principal places of indoor amusements are the theatres, numerous concert-rooms, &c. Philadelphia ranks high as a centre of foreign, inland, and coasting trade. The leading articles of export are grain, provisions, petroleum, anthracite, and gas-coal, iron and ironwares, lumber, tobacco, and cotton (raw and manufactured). The principal imports consist of cotton, woollen, and flax goods, tinplate, iron and iron-ore, chemicals, &c. The total value of imports in 1892 amounted to $63,282,575; total exports, $60,281,402. Philadelphia is the first manufacturing city in the United States, the carpet industry being the largest in the country. The other leading manufactures are iron and steel, machinery and tools, refined sugar, clothing, boots and shoes, brewery products, chemicals, household furniture, &c.—Philadelphia was founded and named by William Penn in 1682 as the capital of his colony of Pennsylvania. For a long time it was almost exclusively occupied and controlled by Quakers. Many of its most important improvements were due to Benjamin Franklin, and it played a most prominent part during the revolutionary war. In May–November, 1876 (a hundred years after the issue of the Declaration of Independence), a Centennial Exhibition was held on the grounds at the south-west extremity of Fairmount Park. It has magnificent R. R. terminals. The Balto. and Ohio R. R. has a splendid one of recent style; the Pennsylvania Railroad station, completed in 1894, is of modern

Gothic, absolutely fire-proof; the train shed is one of the largest single spans ever constructed, being 304 ft., covering sixteen tracks. The Philadelphia and Reading Railroad terminal, finished in 1893, is of composite renaissance, and built of New England granite, brick and terra-cotta. The train shed has a clear span of 266 ft., covering thirteen tracks. No city in the Union is better provided with freight terminals than Philadelphia. Pop., 1892, 1,142,653; Jan. 1, 1899, 1,597,000.

Phile'mon, Epistle of Paul to, one of the books of the New Testament. This epistle, according to the prevalent opinion, was, together with the Epistles to the Ephesians, Colossians, and Philippians, written from Rome during St. Paul's first imprisonment in that city. The only doubt thrown on this opinion by those who accept the genuineness of the epistles is contained in the suggestion supported by Meyer and others, that these epistles were written during the apostle's imprisonment at Cæsarea. The genuineness and authenticity of Philemon is questioned by very few critics.

Phile'tas of Cos, Greek poet and critic, flourished between 350 and 290 B.C. He wrote elegies, epigrams, and prose grammatical works. He was preceptor to Ptolemy Philadelphus, and a favourite model of Theocritus. Fragments of his poems are extant.

Phil'idor, François André Danican, French musical composer and celebrated chess-player, born 1726, died 1795. In early youth he was a chorister in the chapel of Louis XV., and afterwards supported himself as a teacher and copier of music. He travelled in Holland, Germany, England, &c., and in 1753, when in England, he set Dryden's Ode for St. Cecilia's Day to music. He had while here devoted his attention principally to chess; and he gained extended fame from having published his analysis of the game, which is still referred to as an authority. On his return to France, in 1754, he produced about twenty operas at the Opéra Comique. He went to London in 1779, where he produced the music to Horace's Carmen Seculare, his best work. Having been pensioned for his services he abandoned musical composition in 1788 in order to give himself up entirely to chess.

Philip, one of the twelve apostles, according to John's gospel 'of Bethsaida, the city of Andrew and Peter,' and who was called to follow Jesus at Bethany. After the resurrection he was present at the election of Matthias to the apostleship, but is not again mentioned. In the Western church he is commemorated on 1st May.—**Philip the Evangelist,** often confounded with the above, is first mentioned in Acts vi. 5. He preached at Smyrna, where Simon Magus was one of his converts; baptized the Ethiopian eunuch; entertained Paul and his companion on their way to Jerusalem, when 'he had four daughters which did prophesy.'

Philip II., King of Macedon, the most famous of the five Macedonian kings of this name, was a son of Amyntas II., born B.C. 382. He passed a portion of his early years in Thebes, where he became well acquainted with Greek literature and politics, and succeeded his elder brother Perdiccas in 360. His position at first was not very secure, but as he had few scruples and was a man of the highest talents both for war and diplomacy, in a short time he had firmly established himself, had reorganized the Macedonian army, and proceeded to extend his sway beyond his own kingdom. His ambition was to make himself, in the first place, supreme in Greece, and to accomplish this he began by seizing the Greek towns on his borders: Amphipolis, which gave him access to the gold-mines of Mount Pangæus, Potidæa, Olynthus, &c. The 'sacred war' carried on by the Amphictyonic council against the Phocians gave Philip his first opportunity for interfering directly in the affairs of Greece. (See *Greece.*) After the capture of Methone—the last possession of the Athenians on the Macedonian coast—between 354 and 352, Philip made himself master of Thessaly, and endeavoured to force the pass of Thermopylæ, but was repulsed by the Athenians; Philip, however, compensated himself by equipping a navy to harass the Athenian commerce. The terror of his name now provoked the 'Philippics' of Demosthenes, who endeavoured to rouse the people of Athens to form a general league of the Greeks against him; but by 346 he was master of the Phocian cities and of the pass of Thermopylæ, and as general to the Amphictyon council he was the crowned protector of the Grecian faith. In the spirit proper to his office he marched into Greece to punish the Locrians for an act of profanity; but instead he seized the city of Elatea, and began to fortify it. Demosthenes now exerted all his eloquence and statesmanship to raise the ancient spirit of Grecian independence, and a powerful

army was soon in the field, but being without able or patriotic commanders it was defeated at the decisive battle of Chæroneia in August, 338 B.C. After this last struggle for freedom Philip was acknowledged chief of the whole Hellenic world, and at a congress held at Corinth he was appointed commander of the Greek forces, and was to organize an expedition against Persia. While preparing for this enterprise he was murdered in 336 B.C., some say at the instigation of his wife Olympias.

Philip I., King of France, son of Henry I., was born 1052, and succeeded to the throne under the guardianship of Baldwin V., count of Flanders, in 1060. The Norman conquest of England took place in his reign, and he supported Prince Robert, son of the Conqueror, in his revolt against his father. He was a worthless debauchee and was detested by his subjects. He died in 1108.

Philip II., AUGUSTUS, King of France, born 1165, was crowned as successor during the lifetime of his father Louis VII., whom he succeeded in 1180. One of his first measures was the banishment of the Jews from the kingdom, and the confiscation of their property. Philip next endeavoured to repress the tyranny and rapacity of the nobles, which he effected partly by art and partly by force. In 1190 he embarked at Genoa on a crusade to the Holy Land, where he met Richard Cœur de Lion, who was engaged in the same cause in Sicily. The jealousies and disputes which divided the two kings induced Philip to return home the next year. He invaded Normandy during Richard's captivity (1193), confiscated the possessions of King John in France after the death of Prince Arthur (1203), prepared to invade England at the instance of the pope (1213), turned his arms against Flanders and gained the celebrated battle of Bouvines (1214). He died in 1223.

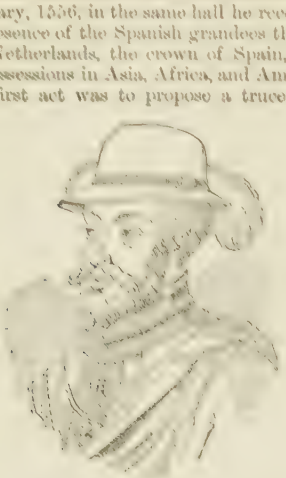
Philip III., called the *Hardy*, King of France, was the son of Louis IX. and Margaret of Provence. He was born 1245, and succeeded his father 1270. In 1271 he possessed himself of Toulouse on the death of his uncle, Alphonso; in 1272 he repressed the revolt of Roger, count of Foix, and in 1276 sustained a war against Alphonso X., king of Castile. The invasion of Sicily by Peter of Aragon, and the massacre of the French, known as 'the Sicilian vespers,' caused him to make war against that prince, in the course of which he died, 1285.

Philip IV. (LE BEL), King of France, was born in 1268, and succeeded his father in 1285. He had already married Joanna, queen of Navarre, by which alliance he added Champagne as well as Navarre to the royal domain, which he made it his policy still further to increase at the expense of the great vassals. He even attempted to take Guienne from Edward I. of England, but afterwards entered into an alliance with that monarch, and gave him his daughter in marriage (1299), from which originated the claim of Edward III. on the crown of France. He was long engaged in war with Flanders, which resulted in the accession of the Walloon territory to France, and the restoration of the rest of Flanders to its count on condition of feudal homage. Philip had been engaged at the same time in a violent dispute with Pope Boniface VIII., in which he was supported by the states-general, and he publicly burned the pope's bull excommunicating him. On the death of Boniface and of Benedict XI. Clement V., who succeeded the latter, was elected by the influence of Philip, and fixed his residence at Avignon. Clement before his election entered into a regular treaty as to the terms on which he should receive the pontificate. The destruction of the order of the Templars (1307–12), and the seizure by the king of their goods and estates, was one of the fruits of this alliance. Philip left numerous ordinances for the administration of the kingdom, which mark the decline of feudalism and the growth of the royal power. He also convoked and consulted the states-general for the first time. He died in 1314.

Philip VI. OF VALOIS, King of France, was the nephew of Philip IV., to whose last son, Charles IV., he succeeded in virtue of the Salique law. He was born in 1293, and succeeded to the crown in 1328. In his reign occurred the wars with Edward III. of England, who claimed the French crown as grandson, by his mother, of Philip IV. (see above article). Philip died in 1350. His reign was unfortunate for France by the long war which it inaugurated, known in France as the Hundred Years' war; and he has left an evil memory by his persecutions of Jews and heretics, his confiscations and exactions.

Philip II. OF SPAIN, was the son of Charles V. and Isabella of Portugal, and was born at Valladolid in 1527. He was married in succession to the Princess Mary of Portugal 1543, and to Mary of England in 1554, the same year in which he became king of Naples and Sicily by the abdication of his father.

In 1555 his father resolved to abdicate the sovereignty of the Netherlands in Philip's favour. This was done in public assembly at Brussels on 25th October, 1555; and on 16th January, 1556, in the same hall he received, in presence of the Spanish grandees then in the Netherlands, the crown of Spain, with its possessions in Asia, Africa, and America. His first act was to propose a truce with



Philip II. of Spain.

France, which was broken almost as soon as concluded. In 1556 he went to England, where he was refused the ceremony of a coronation and the troops that he demanded in aid of his war with France. These, however, were at length conceded to him by Mary, in violation of her marriage articles, and the levy, joined to the army of Emanuel Philibert, duke of Savoy, and Count Egmont, assisted to gain the battle of St. Quintin, 10th August, 1557. On the death of Mary in 1558 Philip, who was still prosecuting the war, made proposals of marriage to her successor, Elizabeth, and was refused. In 1559 the French war was concluded by the peace of Cateau-Cambresis and the marriage of Philip to Elizabeth of France, daughter of Henry II. Philip then finally left the Netherlands, having appointed his half-sister Margaret sovereign of the provinces, his main object in returning to Spain being to check the progress which the Reformation had made there. On his arrival in his native country he had the satisfaction of being present at an *auto-de-fé*; and a few years' perseverance in similar measures extinguished the light of the Reformation, together with the spirit of freedom and enterprise in Spain. The cause of religion in France was also a constant subject of solicitude with Philip. In Naples, as in Spain, his zeal led him to persecute the Protestants; but it was in the Netherlands that his bigotry and obstinacy had their most disastrous, though ultimately fortunate results. In 1566 the revolt of the Netherlands commenced, which ended in the separation of the seven northern provinces from the crown of Spain, and their formation into the Dutch Republic. This struggle lasted about thirty years, till the close of Philip's reign. The events of this protracted struggle were varied in 1567 by a domestic tragedy—the rebellion, arrest, and suspicious death of Don Carlos, the son of Philip and his first wife Mary of Portugal. Shortly afterwards he lost the Queen Elizabeth, his third wife, and about the same time the Moors of Granada revolted, whose subjugation was effected in 1570. In 1571 the Archduchess Anne of Austria became his fourth wife, and the same year his natural brother, Don John of Austria, obtained the great naval victory of Lepanto over the Turks. In 1580 his troops under Alva subdued Portugal, of which, and all its dependencies, Philip now became sovereign. About this time he found political motives for intriguing with the Huguenots in France, and twice in 1582 made offers of assistance to Henry, King of Navarre. In 1584 he renewed his alliance with the League, in order to oppose the succession of Henry to the crown of France. In 1586 Philip declared war with England. The year 1588 saw the destruction of the Armada and the descent of Spain from her position as a first-class power in Europe. The remainder of his reign was occupied with war and intrigues with France, but in 1598 the Peace of Vervins was concluded. Philip showed some disposition at the same time to make peace with England and the Netherlands, but his offers were not accepted, and he died in 1598 without recognizing the independence of the latter country or being reconciled to the former. Before his death he had bestowed the sovereignty of the Spanish Netherlands on his daughter Isabella, subject to the crown of Spain.

Philip V. OF SPAIN, the first Spanish king of the Bourbon dynasty, was born at Versailles 1683, died 1746. He was the grandson of Louis XIV. of France, and succeeded to the crown of Spain by the will of Charles II., who died without direct heirs, as the grandson of Charles's elder sister. On the

death of Charles in November, 1700, he was immediately proclaimed king, and was generally recognized in Spain, Naples, and the Netherlands; but the succession was contested by the Archduke Charles of Austria, whose claim was enforced by the armies of England, Holland, and Austria in the wars of the Spanish Succession, which began in 1702. By the Treaty of Utrecht (1713) he was recognized as King of Spain, but Gibraltar was lost to Spain, Minorca was also ceded to England, Sicily to Savoy, the Netherlands, Naples, and the Milanese to Austria. He married Elizabeth Farnese, niece of the Duke of Parma, in 1714, and Alberoni, the minister of the Duke of Parma in Spain, became prime-minister. As Philip had a son by the first wife, the daughter of the Duke of Savoy, the children of Elizabeth could not succeed to the crown of Spain. Elizabeth wished to provide for them in Italy, and even coveted the reversion of the crown of France. These pretensions formed the basis of schemes on Alberoni's part which alienated France and led to the Triple Alliance formed in 1717 by Great Britain, France, and Holland against Spain, and which was afterwards merged by the accession of Austria into the Quadruple Alliance. The invasion of Spain by the Duke of Berwick compelled Philip to accede to the terms of the alliance. In 1724 Philip resigned the crown of Spain in favour of his son Don Louis, but the death of Louis a few months later induced him to resume the royal power. He died in 1746, after a reign of forty-six years. Philip was constantly governed by favourites, and his constitutional melancholy at last completely incapacitated him for business.

Philip THE BOLD, Duke of Burgundy, born in 1342, was the fourth son of John, king of France. He fought at Poitiers (1356), where, according to Froissart, he acquired the surname of the Bold. He shared his father's captivity in England, and on his return his father, whose favourite he was, made him Duke of Touraine, gave him the Duchy of Burgundy, and made him premier peer of France. He was one of the most powerful French princes during the minority of Charles VI., during whose insanity he acted as regent, retaining the regency till his death in 1404.

Philip I. (THE MAGNANIMOUS), Landgrave of Hesse, born in 1504. He began to reign at the age of fourteen, and introduced the Lutheran religion into Hesse in 1526. In 1527 he founded the University of Marburg, subscribed the protestation to the Diet of Spires in 1529, submitted the Confession of Faith at Augsburg in 1530, and in 1531 formed with the Protestant princes the Schmalkalden League. He was forced to submit to the Emperor Charles V. in 1547, who kept him a prisoner for five years. After his return to his dominions he sent a body of auxiliaries to assist the French Huguenots. He died in 1567.

Philiphaugh, a locality in Scotland 2 miles S.W. of Selkirk, the scene of Sir David Leslie's victory over the Marquis of Montrose, September 13, 1645. A monument marks the field.

Philippa, QUEEN, daughter of the Earl of Hainault, married to Edward III. of England in 1328. She accompanied Edward in some of his foreign expeditions, and at other times defended the kingdom in his absence.

Philippeville, a city and port of Algeria, in the province and 39½ miles N.N.E. of Constantine. It was founded in 1837, is well laid out, has several spacious squares and fine streets; is connected by rail with Constantine, and has a considerable trade. Pop. 17,693.

Philip'pi, a city of Macedonia, now in ruins, founded by Philip of Macedon about B.C. 356. The two battles fought in B.C. 42, which resulted in the overthrow of Brutus and Cassius by Antony and Octavius, were fought here. Philippi was visited on several occasions by the apostle Paul, who addressed to the church there one of his epistles.

Philip'pians, EPISTLE TO THE, one of St. Paul's epistles, is supposed to have been written from Rome towards the close of his first imprisonment there, about A.D. 63. Some authorities suppose it to have been written in Cæsarea. The genuineness of this epistle has been little questioned It is referred to, though not quoted, in the epistle of Polycarp and by Tertullian and other early fathers. Epaphroditus, who conveyed it, was the messenger of the Philippians to Paul, and had been ill at Rome, which had been a cause of anxiety to the Philippians. Paul, therefore, hastened his return, and sent this epistle by him.

Philip'pics, the name given to three celebrated orations of the Greek orator Demosthenes against Philip, king of Macedon (352-342 B.C.). This name was also applied to Cicero's fourteen speeches against Antony, and it has hence come to signify an invective in general.

Philip'pines, or PHILIPPINE ISLANDS, an archipelago and Spanish colony in the Pacific Ocean, lying north-east of Borneo, having on the west the China Sea, on the east the North Pacific, and on the south the Sea of Celebes; area, 114,360 square miles; pop. about 6,000,000. It consists of about 1200 large and small islands. Of the former the chief are Luzon, Mindoro, Samar, Panay, Leyte, Zebu, Negros, Bohol, Mindanao, and Palawan. Luzon is the only island of great commercial importance. It contains the capital Manilla. The shore lines and internal surface of the larger islands are extremely rugged and irregular. Their magnificent mountain ranges are clothed with a gigantic and ever-teeming vegetation; and between these lie extensive slopes and plains of the richest tropical fertility, watered by numerous lakes and rivers, which afford abundant means of irrigation and transport. The climate on the whole is healthy, but hurricanes are common. Earthquakes are frequent, and often very destructive. The principal agricultural product is rice, and next in importance are sugar-cane, tobacco, and coffee. Fibrous plants are also abundant, and among the chief of these are the well-known Manilla-hemp, the cotton-plant, the gomuti palm, ramee, &c. The pine-apple is grown both for its fibre and its fruit. The textile productions of the Philippines, the work of the native population, are considerable in number, ranging from the delicate and costly *pina muslins*, made from the pine-apple fibre, to coarse cottons, sacking, and the mats made of Manilla-hemp and the fibre of the gomuti palm. The islands are rich in minerals, including gold, iron, quicksilver, sulphur, coal, &c., but they are little worked. The foreign trade is mostly in the hands of foreign, especially British and American, mercantile houses, and consists principally in the export of sugar, rice, tobacco, Manilla-hemp, indigo, coffee, birds'-nests, trepang, sapan-wood, dye-woods, hides, rattans, mother-of-pearl, gold-dust, &c., and in importing wines and liqueurs, food-stuffs, and various manufactured articles. The total annual exports average about £4,500,000. The natives are of diverse origin. Wild tribes, some of which are extremely ferocious, still haunt the mountains. The chief mountain tribes are the Negritos, diminutive negroes, who have given their name to the island Negros, though not confined to it; and the Ætas or Itus, a dusky or copper-coloured race. But the great mass of the inhabitants here are divided into the Tagals, inhabiting Luzon, and the Bisayans, who inhabit the other islands. These speak respectively the Tagal and Bisayan tongues, each of which has a variety of dialects. Half-castes, Indo-European and Indo-Chinese, engross much of the business and wealth of the islands. Spaniards are comparatively few. The independent tribes are partly Mohammedan and partly heathen. The largest town and chief seaport as well as the seat of government is Manila. The Philippines were discovered by Magellan in 1520–21. In 1762 Manila was taken and for a short time held by a British fleet. On May 1, '98, was bombarded by the Am. fleet under Com. Dewey, and the Spanish fleet destroyed. Aug. 13 the U. S. land forces under Gen. Merritt and Adml. Dewey captured it after a brilliant engagement. A provisional government was instituted and formal possession taken by the U. S. The natives, then in revolt against Spain, under Aguinaldo, continued in arms against the Americans; numerous engagements resulted and thousands of insurgents slain. Feb. 21, 1899, an attempt was made to destroy Manila by fire, great damage ensued; it was saved, after much loss, by the U. S. troops.

Philippones, a Russian sect, formed in the 17th century, a branch of the Roskolnicians, and so named from its founder, Philip Pustoswiæt. They decline to serve as soldiers, refuse to take oaths, and use the liturgy of the ancient Russo-Greek Church.

Philippop'olis, or FILIBE, capital of the province of Eastern Roumelia, European Turkey, on an island formed by the Maritza, 112 miles W.N.W. of Adrianople by rail. The city is built on the granite terraces of a hill which overlooks the river, and is the centre of a large trade, its own manufactures being silk, cotton, and leather. Pop. estimated at 30,000.

Philippsburg, a town of Baden, on the right bank of the Rhine, 16 miles north of Carlsruhe, formerly a celebrated imperial fortress. In 1734 it was captured by the French under the Duke of Berwick (who lost his life here), and its fortifications were razed in 1800. Pop. 4922.

Philips, AMBROSE, a poet and dramatic writer, born of a Leicester family in 1671; died 1749. He was educated at St. John's College, Cambridge, and subsequently became one of the wits who frequented 'Button's' in London. As a Whig politician he obtained various lucrative posts from the

House of Hanover, while as a poet he was ridiculed by Swift and Pope, receiving the nickname of 'Namby Pamby' (which has since formed a useful English adjective). He wrote six pastorals and three tragedies: the Distrest Mother (1712), taken from Racine; the Briton (1722); and Humphrey, Duke of Gloucester (1723).

Philips, JOHN, an English poet, born in Oxfordshire 1676, died at Hereford 1708. He was educated at Christ Church, Oxford, where he produced the Splendid Shilling, a burlesque poem in Miltonic blank verse. He subsequently wrote Blenheim, a poem in celebration of the Duke of Marlborough's victory; and Cyder, a work in imitation of Virgil's Georgics.

Philis'tines, the name of a Semitic people or race who inhabited the southern part of the lowlands of Palestine, from the coast near

Philistine Prisoners.—Sculptures at Medinet Haboo.

Joppa to the Egyptian desert south of Gaza. They occupied five chief cities (Ashdod, Gaza, Gath, Askelon, Ekron), and these formed a kind of confederacy under five lords or chiefs. Mention is made of this people in Genesis xxi. xxvi., but it was during the time of the Judges in Israel, and subsequently in the reigns of Saul and David, that the Philistines attained their highest power, and from the latter received their greatest defeats. In the wars between Assyria and Egypt the country of Philistia was subdued by Tiglath-Pileser (734 B.C.); but the Philistines still intrigued with Egypt, and made various revolts against Sargon and Sennacherib to assert their independence. During the Babylonian captivity they avenged themselves on their old enemies the Israelites (Ezekiel xxv. 15), but subsequently the two nations seem (Nehemiah xiii. 23), to some extent, to have fraternized. The origin of this race has been a question of much debate by Biblical critics.

Phillip, JOHN, R.A., painter, one of the greatest colourists of the British school, born at Aberdeen 1817, died 1867. After serving his apprenticeship as a house-painter, he received some slight instruction from a local artist, and began to paint portraits. The merit of these induced Lord Panmure to aid him (1836) in going to London, and in attending the schools of the Royal Academy. Two years later he returned to Aberdeen, his pictures at this portion of his career consisting mainly of portraits and subjects from Scottish life, such as The Catechism (1847), Drawing for the Militia (1849), The Baptism (1850), The Scotch Washing (1851), and Collecting the Offerings in a Scotch Kirk (1855). In 1852 and 1856 he visited Spain, and he again returned to that country in 1860. While resident there he was greatly influenced by the works of the Spanish masters, and especially by those of Velasquez. His style completely changed, his subjects became Spanish, and his grasp of colour, composition, and character vastly improved. It is his pictures of Spanish life that have made him famous. Among the more important are Life among the Gipsies at Seville (1853), The Letter-writer of Seville (1854), Death of the Contrabandista (1858), A Spanish Volunteer (1862), Agua Bendita (1863), La Gloria, a Spanish wake (1864), Early Career of Murillo (1865), Chat round the Brasero (1866), two pictures illustrating the Spanish National Lottery, and the unfinished Spanish Boys playing at Bull-fighting in the Scottish National Gallery. In 1860 he painted for the queen The Marriage of the Princess Royal. He was elected A.R.A. in 1857, and R.A. in 1859. Many of his works have been engraved.

Phillips, JOHN, geologist, born 1800, died 1874. He was instructed in geology by his uncle, William Smith, 'the father of English geology,' spent many years in arranging museums and organizing scientific societies in Yorkshire towns; became professor of geology in Dublin (1844) and in Oxford (1856). His chief works are a Guide to Geology (1834), Palæozoic Fossils of Cornwall, Devon, and West Somerset (1841), Manual of Geology (1855), and Life on the Earth (1861).

Phillips, THOMAS, R.A., English portrait-painter, born in 1770, died 1845. In 1792 he exhibited some historical pieces, but soon after turned his attention to portrait-painting. In 1808 he became a member of the Royal Academy, and in 1824 succeeded Fuseli as professor of painting. He published

his Lectures on the History and Principles of Painting in 1833.

Phillips, WENDELL, American orator, was born at Boston, U. S., 1811; died 1884. He was educated at Harvard University, studied law, and was called to the bar (1834); joined the movement for the abolition of slavery in 1837, and gave it the aid of his oratorical gifts and unremitting advocacy until in 1868 the negroes of the United States were made free citizens.

Phillipsburg, Warren co., N. J., has important manuf. interests. Pop. 1890, 8644.

Philo Judæ'us, an Alexandrian Jew of the first century, of whom all that is known is that he belonged to a wealthy family, received a liberal education, and in 40 A.D. visited Rome as one of a deputation to ask the Emperor Caligula to revoke the decree which compelled the Jews to worship his statue. His very numerous writings (which are in Greek) include an account of the Mosaic narrative of the creation, allegorical expositions of other parts of Genesis, lives of Abraham, Joseph, and Moses, treatises on the Decalogue, Circumcision, Monarchy, First-fruits, Offerings, and other subjects.

Philology, or COMPARATIVE PHILOLOGY, a term commonly used as equivalent to the science of language, otherwise called *Linguistic Science*, or *Linguistics*. This science treats of language as a whole, of its nature and origin, &c., and of the different languages of the world in their general features, attempting to classify and arrange them according to such general features, and to settle in what relationship each stands to the others. The philologist as such does not study languages for practical purposes, or to be able to read and speak a number of them, though the more he is tolerably familiar with the better. He rather studies them in the way a naturalist studies a series of animals or plants, as if they were separate organisms each with a life and growth of its own. That every language has such a life and growth is true in a sense, for languages are continually in a state of change; yet a language is not to be regarded as an organism like a plant or an animal, but rather, to quote Professor Whitney, as an *institution*, an outcome of the needs of human beings for communication with their fellows. A language is a system of vocal sounds through which ideas are conveyed from person to person in virtue of the fact that certain ideas are attached or belong to certain sounds by a sort of convention or general understanding existing among those who use the language. That there is any natural law by which one idea belongs to one vocal sound rather than to another can hardly be affirmed in view of the fact that if we select any one idea we shall find that each of the thousand languages of the world expresses this idea by a different sound or group of sounds. Indeed, ideas can be conveyed otherwise than by vocal sounds, as witness the elaborate sign-language that has been developed in some communities, as also the finger-language of the deaf and dumb. We can even conceive that a language of hieroglyphics or written symbols might exist with no spoken language alongside of it. We have, however, no knowledge of any such case, and, in fact, wherever man exists we find him making use of speech, which, indeed, is one of his most distinct and marked characteristics. As to the origin of language nothing is really known, although most probably it is an invention or acquisition of the human race, and not an original endowment. Any one, however, may believe if he pleases that man was created with a language and the faculty of making use of it already in his possession. If the other view is taken we must suppose that the earliest men had no language to start with, but that having suitable organs for speech they devised a language among themselves as a means of intercommunication, and we may conclude that the earliest attempts at speech were either in imitation of the different sounds heard in nature, or that they were based on the inarticulate utterances or cries by which human beings naturally gave vent to different emotions. But however language originally arose, it is very certain that whatever language we speak has to be acquired from others who have already learned to speak it, and that those others have similarly acquired it from their predecessors, and so on backwards into the darkness of the remotest ages. Every language is thus at our birth a foreign language to all of us.

The science of philology is quite of modern origin, being hardly, if at all, older than the present century. Speculations on language and its nature were indulged in by the ancient Greeks; but as the Greeks knew little or nothing of any language but their own, they had not sufficient materials wherewith to construct a science of language. In later times materials became more abundant as scholars studied Hebrew,

Greek, Latin, Arabic, &c.; but it was the introduction of Sanskrit to the western world, and its observed similarity in many respects to Greek that led to the establishment of philology on a true scientific basis, an achievement which was largely due to the labours of Bopp, Pott, Schleicher, and other German scholars. Yet though most valuable results have been attained and a large number of languages have been studied and classified, much remains to be done, much remains uncertain and must always remain so. One great difficulty that the philologist has to grapple with is the want of historical documents to throw light on the history of the great majority of languages, as only a very few possess a literature dating from before the Christian era, and far the greater number have no literature at all.

To begin with our own language and the kindred tongues. Philology has succeeded in showing that the English language is one of a group of closely allied languages which are known by the general name of the Teutonic or Germanic tongues. The other languages of the group, some of which are more closely connected with English than the rest, are Dutch, German, Danish, Icelandic or Old Norse, Swedish, and Gothic; to which may be added, as of less importance and having more the character of dialects, Norwegian, Frisian, the Plattdeutsch or Low German of Northern Germany, and Flemish, which differs little from Dutch. The Teutonic tongues are often divided into three sections, based on closeness of relationship: the *High German*, of which the modern classical German is the representative; the *Low German*, including English, Dutch, Frisian, Plattdeutsch, and Gothic; and the *Scandinavian*, including Danish, Swedish, and Icelandic. Another division is into: *East Germanic*, including Gothic and Scandinavian; and *West Germanic*, including the others.

The evidence that all these languages are closely akin is to be found in the great number of words that they possess in common, in the similarity of their structure, their inflections, their manner of compounding words—in short, in their family likeness. This likeness can only be accounted for by supposing that these languages are all descended from one common language, the primitive Teutonic, which must have been spoken at a remote period by the ancestors of the present Teutonic peoples, there being then only one Teutonic people as well as one Teutonic tongue. In their earliest form, therefore, and when they began to be differentiated, these languages must have had the character of mere dialects, and it is only in so far as each has had a history and literature of its own that they have attained the rank of independent languages.

The rise of dialects is a well-known phenomenon, taking its origin in the perpetual change to which all languages are subject. A language that comes to be spoken over a considerable area and by a considerable number of persons—more especially when not yet to some extent fixed by writing and literature—is sure to develop dialects, and each of these may in course of time become unintelligible to the persons using the others, if the respective speakers have little intercourse with each other, being separated by mountain ranges, arms of the sea, or merely by distance. In this way is the existence of the different Teutonic tongues to be accounted for. A similar instance of several languages arising from one is seen in the case of Italian, French, Spanish, and Portuguese, all of which are descended from the Latin. Of the common origin of these we have, of course, direct and abundant evidence.

The Teutonic tongues, with the primitive or parent Teutonic from which they are descended, have been proved by the investigations of philologists to belong to a wider group or family of tongues, which has received the name of the Aryan, Indo-European, or (especially in Germany) Indo-Germanic family. The chief members of this family are the Teutonic, Slavonic (Polish, Russian, Bohemian), Lithuanian, Celtic (Welsh, Irish, Gaelic, &c.), Latin (or Italic), Greek (or Hellenic), Armenian, Persian, and Sanskrit. Just as the Teutonic tongues are believed to be the offspring of one parent Teutonic tongue, so this parent Teutonic and the other members of the Aryan family are all believed to be descended from one primitive language, the Aryan or Indo-European parent-speech. The people who spoke this primeval Aryan language, the ancestors (linguistically at least) of the Aryan races of Europe and Asia, are believed by many to have had their seat in Central Asia to the eastward of the southern extremity of the Caspian Sea. This, however, is very problematical, and some philologists see reason to think that Europe may rather have been the original home of the Aryans. This

latter view is now perhaps the one most generally held.

How remote the period may have been when the ancestors of the Teutons, the Celts, the Slavs, the Greeks, Romans, Persians, and Hindus were living together and speaking a common language is uncertain. Yet the general character of their language is approximately known, and philologists tell us with some confidence what consonant and what vowel sounds the Aryan parent-speech must have possessed, what were the forms of its inflections, and what, at the least, must have been the extent of its vocabulary, judging from the words that can still be traced as forming a common possession of the sister tongues of the family.

In order to understand how it is that many words in the different Aryan tongues are really of the same origin, though superficially they may appear very different, it is necessary to know something of *Grimm's Law*. This law, which, like a natural law, is simply a statement of observed facts, is so named from the great German philologist who first definitely laid it down as the result of observation and comparison of the relative linguistic phenomena. It concerns the so-called 'mute' consonants (*t, d, th; k, g, h* (*ch*); *p, b, f*), and takes effect more especially when these are initial. According to it, in words and roots that form a common possession of the Aryan tongues, being inherited by them from the parent-speech, where in English (more especially Anglo-Saxon) and in most of the Teutonic tongues we find *t, d*, or *th*, we find in Latin, Greek, and Sanskrit not these letters, but respectively *d* instead of *t*, an aspirated sound instead of *d*, and *t* instead of *th*. That is, an English *t* corresponds to a Latin, Greek, and Sanskrit *d*, as is seen in *tame;* compared with L. *domare*, Gr. *damaein*, Skr. *dam*, to tame; an English *d* corresponds to Latin *f*, Greek *th*, Sanskrit *dh*, as in E. *door*, L. *fores*, Gr. *thyra*, Skr. *dvāra* (for original *dhvāra*), a door; an English *th* corresponds to Latin, Greek, and Sanskrit *t*, as in *thin*, compared with L. *tenuis*, Gr. *tanaos*, Skr. *tanu*, from root *tan*, to stretch. If we next take the gutturals we find that English *k* (or *c* hard), *g, h*, correspond respectively in the above languages to *g, h* (*ch, gh*), *k*, as is seen in E. *kin*, L. *genus*, Gr. *genos*, Skr. *janas* (where *j* is for original *g*); E. *goose* (modified from original *gans*), compared with L. *anser* (for older *hanser*), Gr. *chēn*, Skr. *hansa;* E. *head* (A. Sax. *heafod*), L. *caput*, Gr. *kephalē*, Skr. *kapāla.* Similarly *b* in English corresponds to *f* in Latin, *ph* in Greek, and *bh* in Sanskrit, as in *brother* = L. *frater*, Gr. *phratēr*, Skr. *bhratri*, a brother; *f* in English to *p* in Latin, Greek, and Sanskrit, as in *father* = L. *pater*, Gr. *patēr*, Skr. *pitri*, father. German exhibits certain letter-changes peculiar to itself, and for this reason is placed, in any full statement of Grimm's law, apart from the other Teutonic tongues. In German, for instance, *t* takes the place of an English *d*, as in G. *tag*, E. *day*, G. *teil*, E. *deal; d* the place of *th*, as in G. *ding*, E. *thing*, G. *drei*, E. *three*, &c. In some cases the law does not operate in consequence of the influence of other letters; thus the *s* of *stand* prevents the *t* from becoming *th*, as it ought to do to represent the *t* of L. *stare*, to stand. Certain other exceptions to the law are accounted for by a subsidiary law of more recent discovery than Grimm's law, known as *Verner's Law*, and formulating certain facts connected with the original accentuation of Aryan words.

The Aryan tongues, ancient and modern, are entitled to claim the first rank among the languages of the globe, both for richness, harmony, and variety, and more especially as embodying a series of literatures to which no other family of tongues can show a parallel. Next in importance come the Semitic tongues—Hebrew, Chaldee, Syriac, Arabic, &c. These, like the Aryan tongues, form a well-marked family, one notable peculiarity of which is the possession of 'triliteral' roots, or roots of which three consonants form the basis and give the general meaning, while inflection or modification of meaning is indicated by internal vowel-change. Thus the vowels play a subordinate part to the consonants, and do not, as in the Aryan tongues, associate with them on equal terms. Other important linguistic families are the *Hamitic*, which includes the ancient Egyptian, the Coptic, Berber, Galla, Somali, &c.; the *Turanian* or *Ural-Altaic*, which includes Turkish, Finnish, Hungarian, Mongolian, &c.; and the *South-Eastern Asiatic*, which includes Chinese, Siamese, &c. The Turanian languages belong to the type known as *agglutinate* or *agglutinating*, being so called from the fact that the root always maintains a sort of independence or distinctive existence, the other elements of the word being more or less loosely 'glued' or stuck on as it were. The Chinese is the chief of the *monosyllabic* languages, so called from their words consisting normally

of monosyllables. Other families of languages are the Malayo-Polynesian of the Indian Archipelago and Pacific; the Bântu, a great family of S. Africa; and the American Indian languages, which are characterized as *polysynthetic*, from the way in which they crowd as many ideas as possible into one unwieldy expression. All these families form groups, so far as is known, separate from and independent of each other; and attempts to connect any two of them, as Aryan and Semitic for instance, have met with little success. Formerly etymologists had no hesitation in deriving English words from Hebrew roots, but this was in the days when there was no science of comparative philology. That all languages are descendants of one original tongue, as is believed by many, linguistic science can neither affirm nor deny. We may add that community of language is not a proof of community of race, since it is well known that, as the result of war or otherwise, races have given up the language that once belonged to them and adopted some other.

Philome'la, in Greek mythology, a daughter of Pandion, king of Athens, who being violated and deprived of her tongue by Tereus, the husband of her sister Progne, made known her wrong to the latter by embroidering it in tapestry. In revenge the sisters murdered Itys, the son of Progne by Tereus, and served him up to his father. Tereus pursued them, but they were changed by the gods into birds, Philomela and Progne into a nightingale and a swallow, and Tereus into a lapwing.

Philopœ'men, an ancient Greek patriot and commander, born at Megalopolis, in Arcadia, about B.C. 252. Having distinguished himself in war against the Spartans, he was, in 208 B.C., appointed commander-in-chief of the forces of the Achæan League. He reorganized the Achæan army, defeated and slew with his own hand Machanidas, tyrant of Sparta, and subsequently defeated Nabis, the successor of Machanidas. He induced the Spartans to join the Achæan League; but, soon becoming dissatisfied, they separated from the confederacy, and called in the Romans to their assistance. Philopœmen, as commander of the Achæans, declared war against Sparta, and, having taken the city, treated it with the greatest severity. The Romans, however, interfered, and Sparta was again admitted into the confederacy as an independent state. Messene now revolted, and Philopœmen, though broken by infirmity and disease, drove back the insurgents, but was afterwards taken prisoner, carried in chains to Messene, and compelled to drink poison B.C. 183.

Philosopher's Stone. See *Alchymy.*

Philosophy (Greek, *philosophia*, love of wisdom), a term first brought into general use by Socrates. Philosophy is the science that deals with the general principles which form the basis of the other sciences, and of which they themselves take no cognizance. It follows up the data of experience to their ultimate grounds, regarding each particular fact in relation only to a final principle, and as a determinate link in the system of knowledge. In this view philosophy may be defined as the science of principles.

For all practical purposes the history of philosophy may be treated as commencing with the Greeks, the philosophic notions of the inhabitants of the East being considered merely as introductory to the Greek philosophy, in which many oriental notions were incorporated. The first problem of Greek philosophy was to explain the enigma of external nature, to solve the problem not of the soul but of the world. Thales (about 600 B.C.) stands at the head of the Ionian school, which, with the Eleatic school, was the chief representative of speculative thought in pre-Socratic times; the former of these schools being characterized by Aristotle as seeking to find a material, the latter a formal principle of all things. The material principle sought by the Ionian school was assumed to be water by Thales, a primitive infinite but undetermined matter by Anaximander, and air by Anaximenes. The Pythagoreans, abstracting from the quantitative rather than the qualitative character of matter, substituted a symbolic principle—number—for the sensuous principle; but the Eleatics, transcending alike the sensuous principle of the Ionics and the quantitative principle of the Pythagoreans, conceived of pure being as the one sole substance, the phenomenal world being viewed as unreal. The three great philosophers of this school are its founder Xenophanes, Parmenides, and Zeno. The transition from abstract to concrete being, from the Eleatic principle of unity to the world of phenomena, was attempted by Heraclitus (about 520 B.C.), who asserted for an absolute principle the unity of being and non-being—becoming. According to him all things are in constant flux, the product of conflicting opposites, of the One at once warring and harmonizing with itself. Empe-

docles (440 B.C.), in attempting to solve the reason of this flux, advanced the theory that matter was the principle of permanent being, while force was the principle of movement. The two moving forces in his system were love and hate. According to the Atomists, on the other hand, who are represented by Leucippus and Democritus (450 B.C.), the moving forces became an unintelligible necessity giving form to the world. Anaxagoras (born about 500) asserted reason as the principle, and though he did not develop his theory to any extent, the mere expression of a spiritual principle is sufficient to mark it as forming an era in philosophy. In the hands of the Sophists this principle, in the sense of individual reason, became the occasion of their denial of all objective reality. In Socrates (470–399 B.C.), who united scientific method and a high ethical and religious spirit, the destructive teaching of the Sophists found its keenest opponent. What are called the minor Socratic schools—the Cynics, Cyrenaics, and Megarians—severally professed to regard Socrates as their founder, the Cynics, however, defining the end of action as self-sufficiency, the Cyrenaics as pleasure, and the Megarians as reason. With Plato (430–347) philosophy lost its one-sided character. Though professedly a disciple of Socrates his system of idealism is his own. The Platonic idea is the pure archetypal essence, which is the source of all the finite realities that correspond to it. The visible world is an inferior reproduction of the world of pure ideas, where shine in all their splendour the good, the true, and the beautiful. In logic Plato brings back science to general ideas. In ethics the highest end of man is regarded as the unity of his nature. Plato's ideal theory is criticised by Aristotle, because he gives no real explanation of the connection between the phenomenal and the ideal. In Aristotle's own system, instead of beginning with the general and the absolute, as Plato had done, he begins with the particular and individual. His whole philosophy is a description of the given and empirical; and his method is induction. His system presents us with a number of co-ordinate sciences, each having its independent foundation, but no highest science which should comprehend them all. The three schools of Greek philosophy which followed the systems of Plato and Aristotle, and which mark the declining days of Greece, are those of the Stoics, Epicureans, and Sceptics. Rome had no philosophy properly its own; the universal character of Roman philosophizing was eclecticism, of which Cicero was the most illustrious representative. In Alexandria eastern and western philosophy, as also Judaism, Christianity, and Paganism, came into contact. Neo-Platonism, founded by Ammonius Saccas (A.D. 193), strove to combine, in opposition to Christianity, the chief elements of classical and eastern speculation. Hellenic ideas were mingled with a vague symbolism, and with theories of ecstasy and divine union. Christianity, in the apologists of the 2d century and the Alexandrine fathers, related itself very early to the philosophy of the time, but not until about the 11th century did there begin to manifest itself a distinctive Christian philosophy in scholasticism, which, assuming the dogmas of the church to be absolutely true, sought to justify them to the reason.

Modern philosophy, which begins with the 15th century, is characterized by a freer, more independent spirit of inquiry. First the scholastic philosophy was attacked by those who called to mind the ancient Greek philosophy in its original purity. After this struggle new views were presented. Bacon and Locke on the one hand, and Descartes on the other, stand respectively at the head of the two systems—empiricism and idealism, which begin modern philosophy. Bacon created no definite system of philosophy, but gave a new direction to thought, the empiricism which he founded finally developing into scepticism. The system of Descartes was opposed by Gassendi, and received modifications at the hands of others, especially Malebranche. The most important successor, however, of Descartes was Spinoza, who reduced the three Cartesian substances to unity, to one infinite original substance, the ground of all things, that excludes from itself all negation or determination, and is named God or nature. Locke (1632–1704), who had a precursor in Hobbes (1588–1679), the influence of whom, however, chiefly concerned the history of political science, is regarded as the father of modern materialism and empiricism. As occupying the general position of Locke mention may be made of Isaac Newton, Samuel Clarke, William Wollaston, the Earl of Shaftesbury, and Francis Hutcheson. The philosophy of Locke received a further development in France, where Condillac sought to explain the development of humanity by the simple development of the sensations. Then followed

the materialism of Helvetius, d'Holbach, La Mettrie, and others, including several of the Encyclopedists. In opposition to this materialistic tendency arose the idealism of Leibnitz and Berkeley. The theories of Leibnitz were systematized by Wolff, and from his time to Kant German philosophy assumed no new stand-point. Berkeley (1684–1753), founding on Locke's principle that we are percipient of nothing but our own perceptions and ideas, argued that the existence of bodies out of a mind perceiving them is impossible, and a contradiction in terms. Granting the premises of Berkeley, his conclusions could not be refuted; but it was reserved for Hume to trace out the ultimate consequences of the Cartesian and Lockian philosophy, and thus, though unintentionally, by a sort of *reductio ad absurdum*, to produce the great metaphysical revolution of which Reid and Kant were the first movers. The Scottish or 'common sense' school of philosophy, with Reid (1710–96) at its head, has the merit of having first strongly inculcated the necessity of admitting certain principles independent of experience, as the indispensable conditions of thought itself. Reid therefore directed his inquiries to an analysis of the various powers and principles of our constitution, in order to discover the fundamental laws of belief which form the groundwork of human knowledge. Dugald Stewart, with some deviations, followed in the track of his master; but Thomas Brown departed on many points of fundamental importance from Reid's philosophy. The same occasion that gave rise to the Scottish school also produced the philosophy of Emmanuel Kant. Kant (1724–1804), who may be justly regarded as the father of the philosophy of the 19th century, sought to bring together into unity the one-sided endeavours of his predecessors in the realistic and idealistic schools. He took up a critical stand-point, and from it instituted an inquiry into the origin of our experience or cognition. (See *Kant.*) The ablest opponent of the Kantian philosophy, Jacobi, took the stand-point of faith in opposition to that of criticism, in order to give theoretic certainty to the postulates of the practical reason. In the hands of Fichte the critical idealism of Kant becomes absolutely subjective idealism. 'All that is, is ego;' this is the principle of the Fichtian system; the world is merely phenomenal, consciousness is a phenomenon, perception is a dream. Fichte's subjective idealism found its continuation in the objective idealism of Schelling and the absolute idealism of Hegel. Schelling (1775–1854) started from the ego of Fichte, and by a combination of the doctrine of the ego with Spinozism transformed it into the system of identity. Object and subject, real and ideal, nature and spirit, are identical in the absolute, and this identity we perceive by intellectual intuition. Schelling subsequently, by successively incorporating into his system various opinions from Bruno, Böhme, and others, developed a syncretistic doctrine which constantly approximated to mysticism. Hegel (1770–1831), developing this principle of identity, created the system of absolute idealism. In his philosophy he aims at elevating consciousness to the standpoint of absolute knowledge, and systematically developing the entire contents of this knowledge by means of the dialectical method. Schleiermacher (1768–1834) promulgated an eclecticism to which Plato, Spinoza, Kant, and Schelling were the chief contributors. Schopenhauer (1788–1860) developed a doctrine which may be described as a transitional form from the idealism of Kant to the realism at present prevalent. In opposition to Fichte's subjective idealism, and to Schelling's renewed Spinozism, Herbart (1776–1841) developed a philosophic scheme on the basis of the realistic element in the Kantian philosophy, as also of Eleatic, Platonic, and Leibnitzian doctrines. After the death of Hegel, Feuerbach, Richter, Strauss, Arnold Ruge, and others developed, in an extreme manner, Hegelian thought, and recently Hegelianism has counted more adherents than any other system. Next to it has stood the Herbartian school; and more recently the modification of systems through a return to Aristotle or Kant, and the study of philosophy upon its historic side, have occupied the larger number of minds. While resting in part upon the basis of the doctrines of earlier thinkers, Trendelenburg, Lotze, and others have advanced in new and peculiar paths. In France two philosophical tendencies opposed the sensualism and materialism so universal at the beginning of the century. Of these the one was theosophical and the other found expression in the eclectic and spiritualistic school founded by Royer-Collard as the disciple of Reid, and further built up by Cousin, who incorporated into its body of doctrines a number of German philosophical notions. Jouffroy attempted to unite the philosophy of his predecessor Maine de

Biran to that of the Scottish school, and became associated with the spiritualistic school, to which also belong the names of Garnier, Janet, Rémusat, Franck, Jules Simon, and others. This school has contended valiantly against the pantheistic tendencies of the age. Independent systems are those of Pierre Leroux, Lamennais, Jean Reynaud, and Buchez. Materialism has its supporters in Cabanis, who sees in thought only a secretion of the brain, Broussais, Gall, and others. Positivism, founded by Auguste Comte, numbers not a few followers.

In Great Britain the Scottish school had later exponents in Sir James Mackintosh (1765–1832) and Sir William Hamilton (1788–1856), the last-named largely influenced in some points of his psychology by Kant. Mansel may be mentioned as a disciple of Hamilton. Ferrier (1808–64) assumed a polemical attitude towards the common-sense school in respect of its fundamental peculiarity, as he viewed it, of absorbing philosophy into psychology, as well as on minor details of the system. The associational psychology of Hartley, Priestley, and Dr. Darwin found representatives in the 19th century in James Mill (1773–1836) and his son John Stuart Mill (1806–73), who make the principle of association the sole explanation of psychical phenomena. Bain, Grote, and Lewes followed more or less in the same track. Herbert Spencer attempted to widen the psychological principles of the associational pyschology into a universal doctrine of evolution. Among the chief leaders of philosophic thought opposed to the English school of empiricism may be mentioned the names of the late T. H. Green, Hutchison Stirling, and Edward Caird. In America, as in England, philosophy has been prosecuted more as an applied science, and in its special relations to morals, politics, and theology. Speculation there has been widely influenced by Scottish philosophy. Among the best-known names of transatlantic philosophical writers are those of Jonathan Edwards, Henry P. Tappan, Thomas C. Upham, Francis Wayland, and others. A modified scholasticism, mostly Thomism, prevails in the Catholic seminaries of France, Spain, and Italy. In most of the continental countries German philosophy has exerted no small influence. In Italy a peculiar philosophical school, represented by Rosmini, Mamiani, and Gioberti, has flourished during the present century.

Philos'tratus, Flavius, a Greek writer born at Lemnos about the middle of the 2d century of our era. He taught rhetoric at Athens and subsequently at Rome, where he obtained the favour of the emperor Septimius Severus, and he accompanied the empress Julia Domna in her travels. His principal work is his Life of Apollonius of Tyana, supposed by some critics to be a parody on the Gospels. His other works are the Heroica, a history in dialogue of the heroes of the Trojan war, Lives of the Sophists, Letters, &c.

Philtre, a potion supposed to have the power of exciting love. The preparation was frequently associated with magic rites, and the ingredients were frequently of a harmless, fanciful, or disgusting kind. At times, however, poisonous drugs were employed, the death of Lucretius and the madness of Caligula being alike ascribed to philtres administered by their wives.

Phlebi'tis (Greek, *phleps, phlebos*, a vein), inflammation of the veins. It may affect any of the veins of the body, but more usually manifests itself in the parts of the veins in the vicinity of wounds. The disease is indicated by great tenderness, tension, acute pain, and a knotted, cord-like swelling or hardness in the course of a vein or veins, sometimes attended, when the veins are superficial, with discoloration. In many instances the inflamed veins secrete pus, and if an artificial issue is not given to it the matter makes its way into the adjoining cellular tissue and forms abscesses, when it is peculiarly dangerous. The causes of the disease are numerous, but usually consist of external injuries of various kinds. Women are peculiarly liable to this disease after parturition.

Phlebot'omy (Greek, *phleps, phlebos*, a vein, and *temnein*, to cut), or Venesection, the act of letting blood by opening a vein; a method of treatment formerly applied to almost all diseases, but now chiefly confined to cases of general or local plethora. Another mode of letting blood is by cupping or by the application of leeches. It has been one of the processes of the medical profession from the earliest times.

Phleg'ethon, in the Grecian mythology, a river of fire in the infernal regions.

Phlegma'sia, Phlegmon, in medicine, a diffuse inflammation of the subcutaneous connective tissue in which the pus has a tendency to spread itself through the tissues. The name *phlegmasia dolens* is given to what is otherwise known as *milk-leg*, an

ailment occurring in women after delivery, and consisting in a very painful swelling of the leg accompanied by fever.

Phlogis'ton, a name applied, before the time of Lavoisier, to a hypothetical substance supposed to be contained in all combustible bodies.

Phlox, a genus of perennial herbaceous plants of the natural order Polemoniaceæ, natives for the most part of North America, though some of the species are to be met with in Asia. The flowers, which are favourites in gardens, are of a purple or violet colour, more rarely white or red, with a salver-shaped corolla, and a narrow subcylindrical tube longer than the calyx. The trailing kinds are excellent for rock-work.

Phoca, PHOCIDÆ. See *Seal.*

Phocas, a Greek emperor, born in the 6th century, A.D., of obscure parentage, entered the army in the reign of Mauricius, and rose to be a centurion. At the head of the mutinous soldiery he marched from the Danube to Constantinople, and on the flight of Mauricius took possession of the throne, 602 A.D. The subsequent murder of Mauricius and his family involved him in a war with Persia. He was captured and put to death in 610 by Heraclius the younger and Nicetas, who besieged Constantinople at the head of an expedition fitted out by Heraclius, exarch of Africa.

Pho'cion, an Athenian general, and one of the most virtuous characters of antiquity; supposed to have been born about B.C. 402. In the war with Philip of Macedon the Athenians sent Phocion with some troops to Eubœa, where he obtained a complete victory over the enemy. Some time after he was despatched to assist the cities of the Hellespont against Philip, whom he compelled to retire. According to Plutarch he was nominated commander forty-five times without once applying for the office. He always led a simple life, and cultivated his small farm with his own hands. As the leader of the conservative or aristocratic party he opposed Demosthenes on the question of war with Philip of Macedon, his advice, according to Grote, being eminently mischievous to Athens. He subsequently condemned the confederacy against Alexander the Great, and, after Alexander's death (323 B.C.), the war with Antipater. On each occasion Phocion was employed to make terms with the victorious Macedonians; and though he seems to have used his influence with them to mitigate the burdens upon his country, his conduct readily laid him open to a charge of betrayal. He was accordingly put to death by the popular party in 317 B.C., but his remains were shortly afterwards buried at public expense and his accusers punished.

Phocis (Greek, *Phōkis*), a division of ancient Greece, on the north side of the Gulf of Corinth, between Bœotia on the east and Doris and the Locri Ozolæ on the west. The principal rivers were the Cephissus and Plistus, and the principal mountain Parnassus, on which was situated Delphi with its celebrated oracle. The country is mountainous and unproductive, the valley of the Cephissus being almost the only fertile tract in it. The Phocians were a brave and industrious people, and subsisted chiefly by agriculture. See *Phthiotis.*

Phœbus. See *Apollo.*

Phœnicia, in ancient geography, a country on the coast of Syria, bounded on the east by Mount Lebanon, and containing the celebrated cities Tyre and Sidon. Phœnicia proper was a tract of country stretching along the eastern shore of the Mediterranean, not much more than 28 miles in length, and little more than 1 mile in average breadth; Sidon being situated near its northern, and Tyre not far from its southern boundary. In a wider sense Phœnicia was regarded as beginning on the north with the Island of Aradus, and extending south to the town of Dora, a little below the promontory of Carmel, being about 120 miles in length, and rarely more than 20 in breadth. It is watered by several streams flowing from Lebanon to the sea, such as the Eleutherus, the Adonis, the Lycus, the Tamyras, the Leontes. The country is fertile in timber, corn, fruits, &c.; and besides the great cities of Sidon and Tyre, it was anciently studded with numerous smaller towns, forming almost an unbroken line along the coast. Among these towns in earlier times were Arvad, Accho, Arka, Tripolis, Berytus, Sarepta, Dora, &c. Many of the roadsteads or harbours were excellent, but are now silted up.

The question as to the original seat of the Phœnicians has received no satisfactory solution; but that, like the Jews, they were Semites by race, is well known. Their immigration to the coast of the Mediterranean belongs to prehistoric times. The settlement of Israel in Canaan did not produce any great or permanent change on Phœnicia. The tribes of Naphtali, Asher, and Dan, to

which it was assigned, did not conquer Phœnicia, but occupied only a small portion of it; and the subsequent relations of Israel and Phœnicia were for the most part those of amity, intercourse, and reciprocal advantage. The wealth and power of the Phœnicians arose from their command of the sea, and it was their policy not to provoke any of the nations to the east of them, and not to quarrel unnecessarily with Israel, which was their granary. The relation between Hiram and David was probably but a sample of such international treaties and intercourse. After the division of the Hebrew kingdom Phœnicia would naturally cultivate alliance with the Ten Tribes nearest to it, and Ahab married a Phœnician princess. The country was afterwards successively incorporated in the Assyrian, Babylonian, and Persian empires, but the cities retained more or less their independence. It was next conquered by Alexander the Great, and henceforth simply formed part of Syria.

From a very early period the Phœnicians occupied themselves in distant voyages, and they must speedily have reached to a style of substantial ship-building. Xenophon passes a high eulogy on a Phœnician ship; and they were skilled in navigation and the nautical applications of astronomy. Lebanon supplied them with abundance of timber, and Cyprus gave them all necessary naval equipments, from the keel to the top-sails. In the reign of Pharaoh-Necho these daring navigators even circumnavigated Africa, and the Phœnicians furnished Xerxes with 300 ships, which took part in the battle of Salamis. The commerce of Tyre reached through the world. It traded in the produce of the whole known world, from the ivory and 'bright iron' and ebony and cotton fabrics of India to the tin from Cornwall and Devonshire. Fishing was also an important industry, and the Tyrians sold fish in Jerusalem. The Phœnicians excelled in the manufacture of the purple dye from the shell-fish *murex*, abundant on its coasts. The glass of Sidon was no less famous than the Tyrian dye. Phœnicia produced also articles of silver and gold as well as of brass; its inhabitants were also skilled in architecture and in mining.

The maritime knowledge and experience of Phœnicia led to the plantation of numerous colonies in Cyprus, Rhodes, and the islands of the Ægean — the Cyclades and Sporades—in Sicily, in Sardinia, the Baleric Islands, and in Spain. The most celebrated of the Phœnician colonies, however, was Carthage, in Northern Africa, which extended its sway over the Spanish peninsula and disputed with Rome the supremacy of the Mediterranean.

As was the case in Canaan at the invasion, each Phœnician city was governed by a king or petty chief. A powerful aristocracy existed in the chief towns, and there were also elective magistrates, called by the Romans *suffetes*, a disguised form of the Hebrew *soffet*. Sidon, and afterwards Tyre, exercised a hegemony over the other states. The relation of Phœnicia to her colonies does not seem to have been very close. Their religion, however, bound the mother country and the colonies in a common worship. Carthage often sent presents to the chief Phœnician god; so did Gades and other settlements.

The religion of the Phœnicians was a species of nature-worship, the objects of adoration being the sun, moon, and five planets; or in another form it was the worship of male and female reproductive powers—the former represented as Baal and the latter as Baalith, Ashtoreth, or Astarte. The god called Il, a sort of Phœnician Cronos or Saturn, resembling the Moloch or Milcom of the Ammonites, had human sacrifices offered to him. Marine deities must have held a prominent place in their theogony—deities corresponding to the Greek Nereus and Poseidon, which last was worshipped at Berytus. In the oldest temples there were no images, but there were rude fetishes—conical or oblong stones, possibly aerolites 'fallen from heaven,' and fossil belemnites. While the wealth and commerce of Phœnicia must have brought art and refinement, the people were noted for their dissoluteness. As a people the Phœnicians early obtained a reputation for cunning and faithlessness. They were often pirates; they were certainly slave-traders. They purchased slaves from the northern shores of the Black Sea, and they also kidnapped and sold the children of Israel—a practice which brought upon them the denunciations of the prophets, and a just retaliation was predicted to fall upon them.

The language of ancient Phœnicia was closely akin to Hebrew. The famous passage in the Pœnulus of Plautus illustrates the assertion. Of ninety-four words on a tablet discovered at Marseilles in 1845 relating to the sacrificial ritual no less than

seventy-four are found in the Old Testament. Coins and seals also disclose the same affinity, as do the numerous inscriptions. Proper names can all be explained in the same way. The invention of letters is often ascribed to the Phœnicians. The Greeks believed that letters had been brought to them from Phœnicia by Cadmus. The so-called Cadmean letters of the Greek alphabet are Α Β Γ Δ Ε F Ι Κ L Μ Ν Ο Π Ρ Σ Τ, the sixth letter F being the *digamma*, which afterwards disappeared from the Greek alphabet. The names of these letters have no meaning in Greek, but they have each a significance in Phœnician or Hebrew. The affinity of the old Greek letters in form to the Phœnician and early Hebrew can be easily traced. The literature of Phœnicia has perished. See also *Tyre*, *Sidon*, *Carthage*, &c.

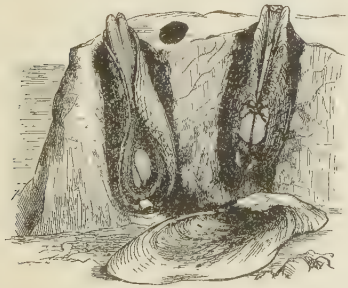
Phœnicop'terus. See *Flamingo.*

Phœnix, a fabulous Egyptian bird, about the size of an eagle, with plumage partly red and partly golden. Of the various stories told of it by Herodotus and others the most popular is to the effect that the bird, at an age of 500 years, conscious of its approaching death, built a funeral pile of wood and aromatic gums, which it lighted with the fanning of its wings, and rose from the flames with a new life. The Egyptians regarded it as a symbol of immortality, and it is still used as an emblem of this.

Phœnix, the scientific name of the date-palm genus.

Phœnixville, a town of the U. States, in Chester co., Pennsylvania, on the Schuylkill, with extensive ironworks. Pop. 8514.

Pholas, a genus of marine Lamellibranchiate bivalves, forming the type of the family Pholadidæ, in which the shell gapes at both ends. The shell, which is of thin white texture, is studded over on its outer surface with numerous rasp-like prominences by means of which the animal excavates burrows in wood, rocks, indurated clay, &c., maintaining communication with the outer world by means of long breathing-tubes or siphons with fringed edges. They are popularly known as 'piddocks,' and are eaten on many parts of the British coasts. The common species is the *Pholas Dactylus;* and the *P. candida*, *P. parva*, and *P. crispata* are also found in Britain. These molluscs appear to possess the power of emitting a phosphorescent light, *P. Dactylus* being specially noted on this account.



Pholades (*Pholas Dactylus*) in their holes.

Phonet'ics, the science which treats of the various sounds pertaining to human speech, their distinctive characteristics, the voice-mechanism by which they are uttered, and the methods by which they may be best represented to the eye. Any system of writing is strictly phonetic when by it each different sound is represented by a different character, and the same sound always by the same character.

Pho'nograph, an instrument by means of which sounds can be permanently registered, and afterwards reproduced from the register. It consists essentially of a curved tube, one end of which is fitted with a mouthpiece, while the other end (about 2 inches in diameter) is closed in with a disc or diaphragm of exceedingly thin metal. Connected with the centre of this diaphragm is a steel point, which, when the sounds are projected on the disc from the mouthpiece, vibrates backwards and forwards. This part of the apparatus is adjusted to a cylinder which rotates on a horizontal axis. On the surface of the cylinder is cut a spiral groove, and on the axis there is a spiral screw of the same pitch, which works in a nut. When the instrument is to be used a piece of tin-foil is gummed round the cylinder, and the steel point is adjusted so as to be just touching the tin-foil, and above the line of the spiral groove. If some words are now spoken through the mouthpiece, and the cylinder kept rotating either by the hand or clockwork, a series of small indentations are made on the foil by the vibratory movement of the steel point, and these markings have all an individual character of their own, due to the various sounds addressed to the mouthpiece. The sounds thus registered are reproduced by approaching the diaphragm and its steel point towards the tin-foil as at first commencing, at the point where it was when

the cylinder originally started, and then once more setting the cylinder in motion. The indentations previously made now cause the steel point to rise or fall or otherwise move as the markings pass under it, and the result is that the diaphragm is thrown into a state of vibration exactly corresponding to the movements induced by the markings, and thus affects the air around so as to produce sounds, and these vibrations being exactly similar to those originally made by the voice, necessarily reproduce these sounds to the ear as the words at first spoken. These marked strips of foil may be posted to any person with whom the speaker wishes to correspond, and who must, of course have a machine similar to that of the sender. The contents of the strips may be reproduced at any length of time, and repeated until the markings become effaced.

Phonog'raphy, a system of writing by which the sounds of a language are accurately represented. The name is generally applied to Pitman's system of shorthand. See *Shorthand.*

Pho'nolite. Same as *Clink-stone.*

Phonom'eter, an instrument for ascertaining the number of vibrations of a given sound in a given space of time.

Phorminx, an ancient Grecian lute or lyre.

Phormium. See *Flax, New Zealand.*

Phosphate, in chemistry, the generic term for the salts formed by the union of phosphoric anhydride with bases or water or both. They play a leading part in the chemistry of animal and plant life, the most important in this connection being the phosphate of soda, phosphate of lime, and the basic phosphate of magnesia. In agriculture the adequate supply of phosphates to plants in the form of manures becomes a matter of necessity in all deplenished soils. These phosphatic manures consist for the most part of bones, ground bones, mineral phosphates (apatite, phosphorite, coprolites), basic slag, superphosphates and reduced superphosphates (both prepared by treating broken-up bones with vitriol), bone-ash and phosphatic guano. See also *Manures.*

Phosphides, compounds of phosphorus with one other element, more especially with the metals.

Phosphor-bronze. See *Bronze.*

Phosphores'cence, the property which certain bodies possess of becoming luminous without undergoing obvious combustion. It is sometimes a chemical, sometimes a physical action. Certain mineral substances exhibit the phenomenon when submitted to insolation, to heat, to friction, to electricity, or to cleavage. Rain, water-spouts, and meteoric dust sometimes present a self-luminous appearance. Several vegetable organisms, chiefly cryptogams, exhibit this kind of luminosity; but the most interesting cases of phosphorescence occur in the animal world, the species in which the luminous property has been observed belonging nearly to every main group of the zoological series. In some of the lowest life forms and in many of the jelly-fishes the whole surface of the body is phosphorescent; in other organisms the phosphorescent property is localized in certain organs, as in the sea-pens, certain annelids, the glow-worms, fire-flies, &c.; while many deep-sea fishes have shining bodies embedded in the skin. The phosphorescence of the sea is produced by the scintillating or phosphorescent light emitted from the bodies of certain microscopic marine animals, and is well seen on the surface of the ocean at night. Phosphorescence in animals appears to be a vital process, consisting essentially in the conversion of nervous force (vital energy) into light; just as the same force can be converted by certain fishes into electricity. See *Fluorescence.*

Phospho'ric Acid (PH_3O_4), an acid usually obtained by burning phosphoretted hydrogen in atmospheric air or oxygen. It is also produced by the oxidation of phosphorous acid, by oxidizing phosphorus with nitric acid, by the decomposition of apatite and other native phosphates, and in various other ways. It is used in medicine in the form of solution, constituting the dilute acid of the Pharmacopœia. It is peculiarly suited to disordered states of the mucous surfaces, and also to states of debility, characterized by softening of the bones.

Phos'phorite, a species of calcareous earth; a sub-species of apatite (which see). It is an amorphous phosphate of lime, and is valuable as a fertilizer.

Phosphoroscope, an instrument designed to show the phosphorescence of certain bodies that emit light but for a very short period. By its means many substances hitherto unsuspected of phosphorescence have been proved capable of retaining light for very short periods. The name is also given to a philosophical toy for showing phosphorescent substances in the dark.

Phosphorous Acid (H_3PO_3), an acid produced by exposing sticks of phosphorus to

moist air, and in several other ways. Phosphorous acid exists usually in the form of a thick uncrystallizable syrup, but it may also be obtained crystallized.

Phos'phorus, a solid non-metallic combustible substance ranking as one of the elements; symbol P, atomic weight 31; specific gravity 1·826. It occurs chiefly in combination with oxygen, calcium, and magnesium, in volcanic and other rocks, whose disintegration constitutes very fertile soils. It exists also in the plants used by man as food, and is a never-failing and important constituent in animal structures. It is manufactured from bones, which consist in part of phosphate of lime, or from native mineral phosphate of lime. Common phosphorus when pure is almost transparent and colourless. At common temperatures it is a soft solid, easily cut with a knife, and the cut surface has a waxy lustre; at 108° it fuses, and at 550° is converted into vapour. It is exceedingly inflammable. Exposed to the air at common temperatures it undergoes slow combustion, emits a white vapour of a peculiar alliaceous odour, appears luminous in the dark, and is gradually consumed. On this account phosphorus should always be kept under water. A very slight degree of heat is sufficient to inflame phosphorus in the open air. Gentle pressure between the fingers, friction, or a temperature not much above its point of fusion, kindles it readily. It burns rapidly even in the air, emitting a splendid white light, and causing intense heat. Its combustion is far more rapid in oxygen gas, and the light far more vivid. The product of the perfect combustion of phosphorus is phosphorous pentoxide or phosphoric anhydride (P_2O_5), a white solid which readily takes up water, passing into phosphoric acid (which see). Compounds of phosphoric anhydride with basic bodies are known as *phosphates* (which see). Phosphorus may be made to combine with most of the metals, forming compounds called *phosphides*. When dissolved in fat oils it forms a solution which is luminous in the dark. It is chiefly used in the preparation of lucifer-matches, and also in the preparation of phosphoric acid. It is of all stimulants the most powerful and diffusible, but on account of its activity highly dangerous. It can be safely administered as a medicine only in extremely minute doses and with the utmost possible caution. Phosphorus presents a good example of allotropy, in that it can be exhibited in at least one other form, known as *red* or *amorphous phosphorus*, presenting completely different properties from common phosphorus. This variety is produced by keeping common phosphorus a long time slightly below the boiling-point. It is a red, hard, brittle substance, not fusible, not poisonous, and not readily inflammable, so that it may be handled with impunity. When heated to the boiling-point it changes back to common phosphorus.

Pho'tius, a patriarch of Constantinople, born of patrician parents in that city early in the 9th century. His wealth and interest raised him to the highest offices of the state, whilst he enjoyed the reputation of being the most universally learned and accomplished man of his age. He became secretary of state under the emperor Michael III., and contracted an intimacy with the minister Bardas, uncle of the emperor. On the deposition of the patriarch Ignatius, Bardas persuaded the emperor to raise Photius to the patriarchal dignity. The installation was recognized by the metropolitans of the patriarchate, but was opposed by Pope Nicholas I., whom Photius soon after excommunicated, thereby laying the foundation of the schism between the Eastern and Western churches. But the Emperor Michael having been murdered in 867 by Basil, who was raised to the throne, that prince immediately replaced Ignatius in his office, and banished Photius, who, however, resumed his dignity on the death of Ignatius in 878. On the accession of Leo, son of Basil, to the imperial throne in 886, Photius was again deposed, and banished to a monastery in Armenia, where he died in 891. Photius was an able ecclesiastical statesman, and a man of great intellect, erudition, and literary power. His chief work is the Myriobiblion, which may be described as an extensive review of ancient Greek literature.

Photo-engraving, a common name of many processes in which the action of light on a sensitized surface is made to change the nature or condition of the substance of the plate or its coating, so that it may by processes be made to afford a printing surface corresponding to the original from which the photographic image was derived.

Photog'raphy (Greek, *phōs, phōtos*, light, and *graphō*, I write) is the art of taking representations of objects by the action of light through the lenses of the camera obscura on a previously prepared surface. It

is of comparatively recent origin, though, as early as the commencement of the present century, Mr. Thomas Wedgewood had discovered a method of copying paintings on glass and of making profiles by the action of light upon nitrate of silver. About 1814 M. Nicéphore Niepce in France discovered a method of producing, by means of the camera obscura, pictures on plates of metal coated with asphaltum, and at the same time of rendering them permanent. In 1839 Daguerre announced the discovery of the Daguerreotype. (See *Daguerreotype Process.*) In the meantime, however, Mr. Henry Fox Talbot had discovered the process of obtaining pictures in the camera by the agency of light on paper coated with chloride and nitrate of silver, and also of fixing them when so obtained. Mr. Talbot gave the name of *calotype* to his process (from *kalos*, fair, and *tupos* or *typos*, an impression), and subsequently introduced various improvements on it, and took out several patents, the earliest being in 1841. It has also been called after him *talbotype*, in the same manner as *daguerreotype* from Daguerre. Numerous modifications of the calotype were introduced, besides various new photographic processes, the most important being those of M. Niepce de St. Victor and Mr. Scott Archer, the former of whom introduced the use of albumen and the latter that of collodion as a substitute for paper, these substances being in either case thinly spread over a plate of glass. Mr. Archer perfected the wet collodion process, and published full working details in 1851. Collodion dry plates were introduced by Dr. Hill Norris in 1856; collodion emulsion dry plates by Messrs. Sayce and Bolton in 1864. In 1871 Dr. R. L. Maddox discovered that glass plates could be coated with an emulsion consisting of bromide of silver contained in gelatine. This gelatine dry-plate process was improved by Bennett in 1878, and came into general use about 1880. It is now almost the only process employed in ordinary photography.

Photographs may be either *negative* or *positive*. *Negative* photographs are produced in the camera, and exhibit the lights and shades contrary to nature, that is, the lights dark and shades white. In order to obtain prints or *positives* several methods are used. In silver printing a paper sensitized by being floated on a solution of albumen mixed with common salt, and then on a solution of nitrate of silver, is placed in close contact with the negative in a printing-frame, and exposed to light until the silver compounds have become sufficiently darkened. It is afterwards toned, fixed, and washed. In the *platinotype* process the paper is sensitized by ferric oxalate and a double salt of potassium and platinum. The latter process requires no toning, and produces a permanent print.

In 1855 M. Poitevin devised a process by which pictures of great beauty and permanence were obtained. He combined carbon or any other pigment, in a fine state of division, with gelatine, starch, or gum, applied it over the surface of his paper, dried it, submitted it to the action of light under a photographic negative, and so first produced what is now usually called a carbon print. In 1864 carbon-printing was brought to a high state of perfection by Mr. Swan of Newcastle, whose plan was to prepare a solution of gelatine and bichromate of potash (the latter being the sensitizing agent), mixed with some black pigment, and apply the mixture as a coating to a sheet of paper, and print his positives on the black cake, or *tissue* as it is called, thus produced. One of the most important discoveries in connection with photographic printing was that of Mr. Walter Woodbury. By his process the hardened tissue is brought into contact with a plate of type metal under considerable pressure. The plate takes the impression of the relief, and pictures are printed from it instead of from the raised tissue. The autotype process, invented by Mr. Johnson, is a more simple and ready method of carbon-printing than the carbon process proper, but the principles involved are the same. It is used for book illustrations and picture reproduction. Photo-lithography, the process of reproducing copies of a photograph from a lithographic stone, was discovered by Asser of Amsterdam in 1859. Various modes of multiplying photographic pictures by photo-lithography have been successfully tried. A common mode is to take a print on paper sensitized with gelatine and bichromate of potassium, and to ink it with a suitable oily ink. This ink adheres to the parts where the gelatine has been acted on by light and has become insoluble, but where the gelatine is still soluble the ink can be easily washed off. It is then transferred to a lithographic stone in the usual way. In *photo-zincography* the process consists in projecting an impression on a plate of prepared zinc by photography and then en-

graving it by etching with acids, so that copies can be printed from the plate. In 1887 it was announced that Mr. Mayall had discovered the secret of taking photographs in natural colours; and that by the Cellerier-Parke's process photography in natural colours was an accomplished fact. Brilliant photographs of spectra have been produced (1892). Since the introduction of the gelatine plate the art of photography has made immense advances, and its applications are endless. Hand (sometimes called *detective*) cameras in all shapes and sizes have been introduced, some of which take pictures of ¼ and ½ plate size. Many improvements have also been made in instantaneous shutters. These are now so carefully adjusted by mechanical appliances that they can be regulated to a small fraction of a second, or a prolonged exposure can be given to any part of the subject at will. These instantaneous processes have enabled scientists to analyse muscular movements and the various modes of locomotion. Remarkable results have also been attained in the application of photography to astronomy, and pictures of the most remote parts of the heavens are now common. Its application in the various processes of book-illustration has also been very successful. Photography by means of artificial light has also been brought to great perfection. Photography is now a scientific and fashionable pastime, and lady and gentleman amateurs in many cases excel professionals. Photographic societies exist in most large towns, the head-centre of these societies in England being the London Camera Club (established 1885), the object being the advancement of photography through the experiments and research of its members, who include all the leading amateur photographers. *See X Rays.*

Photogravure, a process of engraving in which by the aid of photography subjects are reproduced as plates suited for printing in a copper-plate press. The process known as Heliogravure (which see) is essentially the same.

Photo-heliograph, an instrument for observing transits of Venus and other solar phenomena, consisting of a telescope mounted for photography on an equatorial stand and moved by suitable clockwork.

Photo-lithography. See *Photography.*

Photom'eter, an instrument intended to indicate relative quantities of light, as in a cloudy or bright day, or to enable two light-giving bodies to be compared. Photometers depend on one or other of the two principles, that the eye can distinguish whether two adjacent surfaces are equally illuminated, and whether two contiguous shadows have the same depth. Benson's photometer is based on the former principle, Rumford's on the latter. The common unit for comparison is the light emitted by a sperm-candle burning 120 grains of spermaceti per hour, other lights being said to have the intensity of so many candles. Improved forms of photometers for more easily obtaining the illuminating power produced by coal-gas and the electric light have recently been introduced.

Pho'tophone, an instrument invented in 1880 by Prof. Graham Bell, which resembles the telephone, except that it transmits sounds by means of a beam of light instead of the connecting wire of the telephone. The success of the instrument depends upon a peculiar property of the rare metal selenium, that, namely, of offering more or less opposition to the passage of electricity according as it is acted upon or not by light. In its simplest form the apparatus consists at the receiving end of a plane mirror of some flexible material (such as silvered mica) upon which a beam of light is concentrated, and the voice of a speaker directed against the back of this mirror throws the beam of light reflected from its surface into undulations which are received on a parabolic reflector at the other end, and are centred on a sensitive selenium cell in connection with a telephone, which reproduces in articulate speech the undulations set up in the beam of light by the voice of the speaker.

Pho'tosphere, the luminous envelope, supposed to consist of incandescent matter, surrounding the sun. See *Sun.*

Photo-zincography. See *Photography.*

Phragmites (frag-mī'tēz), a genus of large grasses widely spread, and usually known as reeds. *P. communis*, the only British species, is the largest grass in the British islands.

Phrenology (Greek, *phrēn*, mind, *logos*, discourse), the term applied to the psychological theories of Gall and Spurzheim, founded upon (1) the discovery that the brain, as the organ of the mind, is not so much a single organ as a complex congeries of organs; and (2) observations as to the existence of a certain correspondence between the aptitudes of the individual and the configuration of his skull. Phrenology may therefore be regarded as a development, partly scientific

and partly empirical, of the general idea that a correspondence exists between the physical structure and the psychical and mental traits of every individual man or animal. It was long ago observed by physiologists that in animals a certain character and intelligence seemed to accompany a certain formation and size of skull. Lavater, in his system of physiognomy, went further than this, and gave to particular shapes of the head certain powers and passions: the conical head he terms *religious;* the narrow retreating front, *weak-minded;* the broad neck, *salacious*, &c. But it was reserved to Drs. Gall and Spurzheim to expand this germ of doctrine into a minute system, and to map out the whole cranium into small sections, each section being the dwelling-place of a certain faculty, propensity, or sentiment. Gall first started this so-called science; but to Spurzheim it is mainly indebted for its systematic arrangement, and to Dr. Combe of Edinburgh for its advocacy. Gall commenced giving private lectures on the subject in 1796. In 1800 he was joined by Spurzheim, who continued his colleague till 1813, both conducting their researches in common, and travelling together from place to place. At Paris their theories were investigated by a commission of the Institute of France, the result being an unfavourable report drawn up by the celebrated Cuvier. In 1814 Spurzheim came to Britain, where his lectures gained many disciples, among others George Combe of Edinburgh, one of the best expounders and defenders of phrenology which the science yet can boast. Spurzheim eventually went to America, where he died in 1832.

So far as phrenology was scientific it undoubtedly was one cause which led to the minute anatomical investigations to which the brain has latterly been subjected; and Gall and Spurzheim have high claims to be regarded as anatomical discoverers and pioneers. Previous to their dissections the brain had generally been regarded as a single organ rather than a complex congeries of organs. Gall's view of the physiology of the brain was, that the convolutions are distinct nervous centres, each having its own special activity; that the frontal lobes are occupied by the perceptive group of centres; the superior lobes by the moral and æsthetic groups; the inferior lobes by the group mainly concerned in the nutrition and adaptation of the animal to external conditions; and the posterior lobes to the social instincts. To a considerable extent these views have been pronounced to be well founded by later specialists, and thus the leading positions of Gall and Spurzheim have taken a place in scientific psychology as represented by Bain, Carpenter, Ferrier, Wagner, Huschke, and others.

The empirical side of phrenology, sometimes called *craniology*, rests upon the assumption that the relative development of the centres of the brain can be accurately determined by an external examination of the protuberances and depressions of the skull. Craniology is admitted to have a certain degree of foundation in the general truths of physiology, but it cannot pretend to scientific exactness or well-reasoned theory, and in the hands of those who know it best it usually makes no such claim. Its conclusions, like its data, are uncertain and general, because in attempting to delineate a man mentally, morally, and psychically, there are so many things other than the external shape of the skull which have to be taken into account, and also so many things of essential importance of which it is impossible to take account. For example, the cranium may be small, and yet, owing to the depth of the furrows, the cortex or thinking membrane of the brain may be large; on the other hand, owing to the superficial nature of the furrows, a large cranium may co-exist with a very limited development of cortex; and such a fact as this, it is obvious, is unverifiable in any special instance without *post mortem* examination. It is only in America that empirical phrenology, or craniology, ever flourished. In Britain it produced a temporary excitement, but never had much real popularity, and the little it did have it seems to have lost.

Phrygia, in ancient geography a region comprising the western central part of Asia Minor, containing the cities Apamea, Laodicea, and Colossæ. The inhabitants were early civilized, and paid much attention to grazing and tillage. The early history of Phrygia is mythological. Several of its kings are mentioned of the names of Gordius and Midas. On the death of Adrastus (B.C. 560) the royal family of Phrygia became extinct, and the kingdom became a province of Lydia. It afterwards formed a part of the Persian, and still later of the Roman Empire.

Phryne (330 B. C.), a famous courtesan of Greece, mistress of Praxiteles, who employed her as a model for his statues of Venus. She offered to rebuild Thebes, if the

inscription 'Alexander destroyed this city, and the courtesan Phryne restored it,' be put upon the walls; but the offer was rejected.

Phthio'tis, a district of ancient Greece, in the south of Thessaly, now forming with Phocis a nomarchy of Greece. Pop. 128,440.

Phthisis (thī'sis). See *Consumption*.

Phycology, that department of botany which treats of the algæ or sea-weeds.

Phylac'tery, among the Jews a strip of parchment inscribed with certain texts from the Old Testament, and inclosed within a small leathern case, which was fastened with straps on the forehead just above and between the eyes, and on the left arm near the region of the heart. The four passages inscribed upon the phylactery were Ex. xiii. 1–10, 11–16; Deut. vi. 4–9; xi. 18–21. The custom was founded on a literal interpretation of Ex. xiii. 16; Deut. vi. 8; xi. 18. Phylacteries are the 'prayer-thongs' of the modern Jews. In their origin they were regarded as amulets, which protected the wearer from the power of demons, and hence their name, which is from the Greek *phulassein*, to guard.

Phyllium. See *Leaf-insects*.

Phyllodium, in botany the name given to a leaf-stalk when it becomes developed into a flattened expansion like a leaf, as in some Australian species of acacia and certain other plants.

Phyllop'oda ('leaf-footed'), an order of Crustacea, possessing numerous feet, numbering eight pairs at least, the first pair being natatory in character. The feet are of foliaceous or leaf-like structure, and are provided with branchial appendages, adapted to subserve the breathing or respiratory function. The carapace, or shelly covering protecting the head and chest, may be well developed, or the body may be destitute of a covering. In their development the Phyllopoda pass through a metamorphosis; and in their earliest state the embryos appear as in the 'nauplius' form (see *Nauplius*). All the Phyllopoda are of small size. The order is represented by the familiar 'fairy shrimps' (*Chirocephălus*), met with in fresh-water ponds, and the curious 'brine shrimps' (*Artemia*), found in the brine-pans of salt-works, and in the salt lakes of both the Old and New Worlds. The Phyllopoda are of high interest to the palæontologist, on account of the affinities they present to the extinct trilobites (see *Trilobite*). The Phyllopoda themselves are represented as fossils in the Palæozoic rocks.

Phyllostom'idæ, the vampire bats, a family of insectivorous bats. See *Vampire-bat*.

Phylloxe'ra, a genus of plant-lice, family Aphidæ, order Hemiptera. The type of the genus is *Phylloxera quercus*, a species which lives upon oak-trees; but the *Phylloxera vastatrix*, or grape Phylloxera, a species which injuriously affects the vine, has attracted so much attention of late years that it has come to be known as *the* Phylloxera. It presents itself in two types, the one gall-inhabiting (*gallicola*), and the other root-inhabiting (*radicola*). Its proper home is North America, where it was known early in the history of grape-culture, and where it doubtless existed on wild vines from time immemorial. It was discovered in England in 1863, and about the same time it made its appearance in France, where it committed great ravages, inflicting immense loss upon the owners of vineyards. Widening its area not only by natural means, but also by commerce in vines and cuttings, it was carried from infected to non-infected districts, and spread to Spain, Portugal, Switzerland, Austria, Prussia, and to all the grape-growing countries of Europe. Only where the soil was of a sandy nature did the vineyards escape. In 1885 its presence was discovered in Australia, at the Cape of Good Hope, and in Algeria; and, generally speaking, it has now obtained a foothold, at least in restricted localities, in every country where the grape-vine is cultivated. Vines attacked by Phylloxera generally show external signs the second year of attack in a sickly yellowish appearance of the foliage and in stunted growth, and the third year they frequently perish, all the finer roots having decayed and wasted away. Many remedies have been proposed, but none are universally practicable or satisfactory.

Physalia atlantica (Portuguese man-of-war).

Physa'lia, a genus of marine animals of the class Hydrozoa, of the sub-class Siphonophora. The *P. atlantica* is known by the name of the *Portuguese man-of-war*. These hydrozoa are characterized by the presence of one or more large air-sacs, by which they float on the surface of the ocean. Numerous

tentacles depend from the under side, one class short and the other long. The shorter are the nutritive individuals of the colony, the longer, which in a Physalia 5 or 6 inches long are capable of being extended to 12 or 18 feet, possess a remarkable stinging power, and are probably used to stun their prey.

Physe'ter. See *Sperm-whale.*

Physical Geography is that branch of geography which treats of the surface of the earth, or of any part of it as regards its natural features and conformation, the changes that are constantly taking place and that have formerly taken place so as to produce the features now existing; it points out the natural divisions of the earth into land and water, continents, islands, rivers, seas, oceans, &c.; treating of the external configuration of mountains, valleys, coasts, &c.; and of the relation and peculiarities of different portions of the water area, including currents, wave-action, depth of the sea, salt and fresh water lakes, the drainage of countries, &c. The atmosphere in its larger features is also considered, including the questions of climate, winds, storms, rainfall, and meteorology generally. Lastly it takes up various questions connected with the organic life of the globe, more especially the distribution of animals and plants, and their relation to their environment; tracing the influence of climate, soil, natural barriers or channels of communication, &c., upon the growth and spread of plants and animals, including in the latter the various races of man. The field of physical geography is thus by no means easy to confine within strict limits, as it is so closely connected at various points with geology, mineralogy, botany and zoology, chemistry, ethnology, &c.

Physicians, Royal College of (London), a body which owes its origin to the exertions of Thomas Linacre, one of the physicians of Henry VIII., who, through the influence of Cardinal Wolsey, obtained in 1518 from that monarch letters patent incorporating himself with certain other physicians named, and all other men of the same faculty in London, as one body. Various privileges were accorded to them, the chief of which was that of prohibiting any one from practising as a physician in London, or within a circuit of 7 miles round it, unless he had first obtained a license from this corporation. A charter granted four years later confirmed the privileges of the body, except that graduates of Oxford and Cambridge were permitted to practise within the jurisdiction of the college without previously being examined by it. Various charters have been granted to the body subsequently, but since the passing of the Medical Act of 1858, the license of the college is not necessary to those practising in London or within 7 miles round.

Physick, Philip Sing, surgeon, was born in Philadelphia, Pa., in 1768. He graduated at the University of Pennsylvania in 1785. In 1791 was licensed by the Royal College of Surgeons in London. In 1805 was made Professor of Surgery in University of Pennsylvania. In 1825 was elected member of the French Academy of Medicine, and in 1836 honorary fellow of the Royal Medical and Chirurgical Society of London. One of his most brilliant successes was that of enterotomy on Chief-Justice Marshall, which resulted in the removal of over 1000 calculi and a perfect cure. He introduced numerous valuable instruments and improved modifications of others, and applied novel methods of treatment. He was called the "father of American Surgery." He died in 1837.

Physic-nut, the seed of the *Curcas purgans* (*Jatrŏpha purgans*), or the plant itself, a shrub belonging to the natural order Euphorbiaceæ, a native of intertropical countries, principally the East and West Indies. The seeds have acquired the name in virtue of their strong emetic and purgative properties, due to a fixed oil which resides principally in the embryo. This oil is expressed and used in medicine under the name of *Jatropha-oil*, for the same purposes as croton-oil, although it is less powerful. The name of French or Spanish physic-nuts is given to the seeds of another member of the same genus, the *Curcas multifidus*, a native of the same regions. The oil expressed from it is called Oil of Pinhoen, and is similar in its properties to Jatropha-oil.

Physics (from Greek, *physis*, nature), or **Natural Philosophy,** is the study of the phenomena of the material world, or of the laws and properties of matter; more restrictedly it treats of the properties of bodies as bodies, and of the phenomena produced by the action of the various forces on matter in the mass. It thus has as its chief branches the subjects dynamics, hydrostatics, heat, light, sound, electricity, and magnetism. See the different articles.

Physiog'nomy, the doctrine which teaches the means of judging of character from the

countenance. Aristotle is the first who is known to have made any attempts in physiognomy. He observed that each animal has a special predominant instinct; as the fox cunning, the wolf ferocity, and so forth, and he thence concluded that men whose features resemble those of certain animals will have similar qualities to those animals. Baptista della Porta, in his work De Humana Physiognomia (1586), revived this theory and carried it out further. The theory was adopted and illustrated by the French painter Lebrun, in the next century, and by Tischbein, a German painter of the 18th century. The physiologist Camper sought new data in a comparison of the heads of different types of the human species, and in attempting to deduce the degree of intelligence belonging to each type from the size of the facial angle. Lavater was the first to develop an elaborate system of physiognomy, the scope of which he enlarged so as to include all the relations between the physical and moral nature of man. (See *Lavater.*) It is a subject of great interest, but one must be on his guard against a general application of the rules which experience seems to have furnished him.

Physiog'raphy, a term often used as equivalent to physical geography (which see); but otherwise used to embrace the aggregate of information necessary to be acquired as a preliminary to the thorough study of physical geography, or as an introduction to the study of nature and its forces.

Physiologus, same as Bestiary. See *Bestiaires.*

Physiol'ogy, in medical and biological science the department of inquiry which investigates the *functions* of living beings. In its wide sense the living functions of both animals and plants fall to be investigated by physiology, this division of the subject being comprehended under the terms *comparative physiology* and *animal* and *vegetable physiology.* When more specially applied to the investigation of the functions in man the appellation *human physiology* is applied to the science. The importance of physiological inquiry in connection with the observation of diseased conditions cannot be overrated. The knowledge of healthy functions is absolutely necessary for the perfect understanding of diseased conditions; and the science of *pathology*, dealing with the causes and progress of diseases, may in this way be said to arise from, and to depend upon, physiological inquiry. Physiology in itself thus forms a link connecting together the various branches of natural history or biology and those sciences which are more specially included within a medical curriculum. The history of scientific physiology may be said to begin with Aristotle (384–322 B.C.), who attained no mean knowledge of the subject. The Alexandrian school, flourishing about 280 B.C. under the Ptolemies, and represented by Erasistratus, Herophilus, and others, obtained greater opportunities for the acquirement of physiological knowledge, through the investigation of the bodies of criminals who had been executed. Erasistratus thus threw much light on the nervous system and its physiology; whilst Herophilus made important observations on the pulse, and in addition discovered the lacteal or absorbent vessels. After this there was a period of decline, but Galen, living in the 2d century after Christ, again raised the science to a respectable position, and effected a vast advance and improvement in physiological knowledge. The systems which succeeded Galen and his times consisted, until about 1543, of absurd speculations and theories, conducive in no respect to the advance of true knowledge. In 1543 Vesalius paved the way towards the more scientific epochs of modern times by his investigations into the anatomy and structure of the human frame. In 1619 Harvey, the 'father of modern physiology,' discovered the circulation of the blood. Since this time the history of physiology has gone hand in hand with the general history of anatomy (which see). One noteworthy peculiarity of modern physiological research consists in the introduction and extensive use of the experimental mode of investigation in physiology; and of elaborate and delicate instruments and apparatus, such as the sphygmograph, or pulse-recorder; the ophthalmoscope; the laryngoscope; and the microscope. The different departments of physiology may be enumerated as comprehending the investigation of the three great functions which every living being performs, namely, (1) *nutrition*, including all that pertains to digestion, the circulation, and respiration; (2) *innervation*, comprising the functions performed by the nervous system; (3) *reproduction*, which ensures the continuation of the species and includes also the phenomena of *development.* See the articles *Digestion*, *Respiration*, *Skin*, *Eye*, *Ear*, *Larynx*, *Tongue*, &c.

Physostigma. See *Calabar Bean.*

Physos'tomi, a name used as equivalent to Malacopteri, a sub-order of Teleostean fishes. See *Ichthyology.*

Phytel'ephas. See *Ivory-palm.*

Phytog'lyphy (Gr. *phyton,* a plant, *glyphō,* to engrave), the art of printing from nature. See *Nature-printing.*

Phytolac'ca, a genus of tropical or sub-tropical herbaceous plants, type of the nat. order Phytolaccaceæ. One species is the American pokeweed (which see).

Phytol'ogy, a word sometimes used for *botany.*

Phytozo'a, a name synonymous with *Zoophytes.*

Piacenza (pyä-chen'tsä, anc. *Placentia*), a town of North Italy, capital of province of same name, nearly equidistant from Parma and Milan, at the confluence of the Trebbia with the Po. Being a place of strategic importance it has long been fortified, and is still surrounded by walls with bastions and fosse, outside which are a series of detached forts. The principal edifices are the cathedral, in the Lombard-Romanesque style (mostly built between 1122 and 1233) and other churches; the town-house, of the 13th century, one of the finest structures of its kind; and the Palazzo Farnese (now used as barracks). Piacenza is an important railway centre. The manufactures consist of cotton goods, woollens, stockings, hats, leather, &c., and there are also several silk-spinning and paper-mills. Piacenza was originally a Roman colony and was founded in 219 B.C. Between 997 and 1035 it was governed by its bishops. In 1447 it was captured and sacked by Francesco Sforza; and in 1545 it was united with Parma to form an hereditary duchy for Pierluigi Farnese, son of Pope Paul III. Pop. 34,987. —The province belongs to the basin of the Po, and is generally fertile; area, 965 sq. miles; pop., 226,717.

Pia Mater, one of the membranes investing the brain. See *Brain.*

Piana dei Greci (pyä'nä de-i-grä'chē), a town in Sicily, in the province and 10 miles S.S.W. of the city of Palermo. Pop. 7714.

Piano (Italian), soft, low; used in music in contradistinction to *forte. Pianissimo,* the superlative of *piano.*

Pianoforte, or PIANO, a musical stringed instrument, the strings of which are extended over bridges rising on the sounding-board, and are made to vibrate by means of small felted *hammers,* which are put in motion by *keys,* and where a continued sound is not intended to be produced have their sound deadened immediately after the touch of the keys by means of leathern *dampers.* Its name is compounded of two Italian words signifying soft and strong, and it was so called in contradistinction to the harpsichord, the instrument which it superseded, and which did not permit of the strength of the notes being increased and diminished at will. The mechanism by which the movement of the keys is conveyed to the strings is called the *action,* and there is no part of the pianoforte in which the variations are more numerous. There are usually three strings in the pianoforte for each note in the higher and middle octaves, two in the lower, and one in the lowest notes. The strings are of steel wire. The lowest notes have their strings wound round with a double coil of brass wire, and those next above with a single coil. Pianofortes are either in the form of the grand piano, in which the strings lie in the direction of the keys, or they have the strings stretched vertically perpendicular to the keys, which is now the most common form, and constitutes the upright piano. Recently a variety called the upright grand has also been introduced. Grand pianos are used as concert instruments, and have the greatest compass and strength. The common compass of the piano at present is six and seven-eighths or seven octaves. The invention of the pianoforte can scarcely be ascribed to any one man in particular. The first satisfactory hammer-action appears to have been invented by an Italian of Padua, named Bartolommeo Cristofali, about 1711. The instrument was not introduced into England till the latter half of the 18th century. Among the principal improvers of the pianoforte are Sebastian Erard, the founder of the celebrated firm still in existence; Roller et Blanchet, the French firm which introduced the upright piano; Broadwood, Collard, Hopkinson, Kirkman, Bechstein, Steinway, Chickering, Weber, Decker, Meyer, Steck, Knabe.

Pi'arists, a R. Catholic religious order, devoted to the gratuitous instruction of youth, instituted at Rome, about the end of the 16th century. The Piarists resemble the Jesuits in their costume, and in their devotion to the service of the church and to education; but they do not meddle in political matters. Italy, Austria, Hungary, and Spain have been the chief seats of their activity.

Piassa'ba, or PIASSA'VA, a strong vegetable fibre imported from Brazil, and largely used for making brooms. It is chiefly obtained from palms such as *Attalēa funifĕra* and *Leopoldinia piassāba*. The fibre proceeds from the decaying leaves, the petioles of which separate at the base into long, coarse, pendulous fringes. It was first utilized in England, and the consumption is now large. Other European countries also consume considerable quantities.

Piastre (pi-ăs'tr), a name first applied to a Spanish coin, which, about the middle of the 16th century, obtained almost universal currency. The Spanish piastre had latterly the value of about 4*s*. The Turkish piastre, originally worth about 3*s*. 6*d*., has now declined in value to about 2*d*. in Turkey and 2½*d*. in Egypt.

Piat'ra, a town in Roumania, on the Bistritsa, 53 miles south-west of Jassy. It carries on a large trade in grain and timber. Pop. 13,890.

Piauhi (pi-ou-ē'), or PIAUHY, a province of Brazil, bounded by the Atlantic and the provinces of Ceará, Pernambuco, Bahia, and Maranhão, from which latter it is separated by the Parnahyba; area, 81,755 square miles. Its coast-line is not above 10 miles in length. The soil, generally composed of alluvium, is of great natural fertility; but there is very little agriculture. The rearing of cattle, esteemed the best in Brazil, constitutes the principal source of wealth. Capital, Therezina; port, Parnahyba. Pop. 1888, 266,933.

Piaz'za (Italian), in architecture, is a square or other open space surrounded by buildings. The term is frequently, but improperly, used to signify an arcaded or colonnaded walk.

Piazza-Armeri'na, a town of Italy, in Sicily, province of Caltanissetta, and 18 miles E.S.E. of the town of Caltanissetta, said to have been founded by Greeks from Platæa. Pop. 18,252.

Piazzi, GIUSEPPE, Italian astronomer, born in 1746, died 1826. In 1780 he became professor of mathematics at Palermo, where he promoted the establishment of an observatory and compiled his Catalogue of the Stars. January 1, 1801, he discovered the planet or asteroid Ceres, which opened the way for the discovery of so many others.

Pibroch (pē'broh), a wild irregular species of music peculiar to the Highlands of Scotland. It is performed on a bagpipe, and adapted to excite or assuage passion, and particularly to rouse a martial spirit among troops going to battle. The pibroch produces by imitative sounds the different phases of a battle—the march, the conflict, the flight, the pursuit, and the lament for the fallen.

Pica, a size of type. See *Printing*.

Pica, the generic name of the magpies.

Pica, a depraved form of appetite. See *Appetite*.

Picard (pi-kär), JEAN, French astronomer, born in 1620, died in 1682. In 1655 he became Gassendi's successor in the chair of astronomy in the Royal College of France. The measurement of an arc of the meridian is the work by which Picard is now chiefly known — a measurement historically important in the science of astronomy, as it furnished Newton with the means of verifying his theory of gravitation.

Picard, LOUIS BENOÎT, a French writer of comedies, born in 1769, died in 1828. Before he was quite eighteen he became an actor, and almost as early he began to write for the stage. Picard, on account of his skilful delineation of character, was called by the French *Le petit Molière*. He was the author of more than seventy larger and smaller pieces, besides several romances.

Pic'ardy, formerly a province of France, in the northern part of the kingdom, lying between the British Channel, Normandy, and Artois, now divided among the departments of Pas-de-Calais, Somme, Aisne, Oise, and Nord. The capital was Amiens.

Piccini (pit-chē'nē), NICCOLÒ, Italian musical composer, born in 1728, died in 1800. He composed comic and serious operas, chiefly for the stages of Rome and Naples, with such success that for many years he was without a rival in Italy. In 1776 he accepted an invitation, on very favourable terms, from the French court, and went to Paris, where he engaged in the famous musical contest with Gluck. (See *Gluck*.) In his later years he fell into misfortunes. He wrote over 150 operas, besides numerous oratorios and cantatas.

Pic'colo (Italian, *little*), a small flute having the same compass as the ordinary flute, but pitched an octave higher.

Piccolom'ini, a distinguished Siennese family, still flourishing in Italy in two branches. The two most celebrated members are:—1. ÆNEAS SYLVIUS BARTHOLOMÆUS, afterwards Pope Pius II. (See *Pope Pius II.*)—2. OCTAVIO, a grand-nephew of the first, born in 1599, died in Vienna in 1656. He served in the armies of the German em-

peror, and became one of the distinguished generals in the Thirty Years' war. He was a favourite of Wallenstein, who intrusted him with a knowledge of his projects, when he purposed to attack the emperor. In spite of this he made himself the chief instrument of Wallenstein's overthrow, and after the latter's assassination (1634) was rewarded with a portion of his estates. He is one of the principal characters in Schiller's drama of Wallenstein, to the second part of which he gives the title. His son Max, who appears in the same play, is an invention of the poet's.

Pice (pīs), a small East Indian coin, value about ⅛*d.* each.

Pichegru (pēsh-grü), CHARLES, French general, born at Arbois, department of Jura, 1761. He was for some time a tutor at the College of Brienne, but soon exchanged this profession for that of a soldier. After the outbreak of the French Revolution he rose rapidly; was commander-in-chief of the army of the Rhine in 1793, and of the army of the north in 1794; subjugated Holland, and entered Amsterdam in January 1795. Pichegru was now at the height of his fame, and was honoured by the Convention with the title of saviour of his country; but, disgusted with the anarchical state of affairs then prevailing in the capital, he entered into negotiations with the Bourbons, and became the soul of the party hostile to the revolution. Having been proscribed in consequence of the events of the 18th Fructidor (September 4, 1797), he was transported to Cayenne, but the year following escaped to England, where he entered into a conspiracy with George Cadoudal to assassinate Napoleon. Having gone to Paris for this purpose, he was captured by the police, and committed to the Temple prison, where he was found strangled on the 6th of April, 1804.

Pichinch'a, a volcano of Ecuador, in the Western Cordillera, north-west of Quito; height, 15,560 feet. It gives name to a province of Ecuador; capital, Quito.

Pichurim-beans. See *Pitchurim.*

Pi'cidæ, the woodpecker family, so named from the chief genus *Picus.* See *Woodpecker.*

Pick'erel, the young of the fish known as the pike. In America the name is given to some of the smaller kinds of pike.

Pickering, market town of England, in North Riding of Yorkshire, 32 miles north-east of York. It is a town of great antiquity. Its castle was the prison of Richard II. in 1399. Pop. 3959.

Pickles, vegetables and certain fruits first steeped in strong brine, and then preserved in close vessels. Wood vinegar is often used, but malt or wine vinegar produces the best pickles. Owing to the corroding effects of brine and vinegar the use of metallic vessels should be avoided in making pickles. To give a green colour to pickles verdigris or other poisonous compounds of copper is sometimes employed by manufacturers.

Pico, one of the Azores, consisting of a single volcanic mountain, which terminates in a peak (El Pico) 7613 feet high, that emits smoke and lava. It is fertile and well wooded, and produces an excellent wine, of which 25,000 pipes are exported annually. Area, 254 sq. miles; pop. 27,904.

Pico della Mirandola. See *Mirandola.*

Picotee'. See *Carnation.*

Picquet. See *Piquet.*

Picric Acid. See *Carbazotic Acid.*

Picton, SIR THOMAS, British general, born in Pembrokeshire 1758; entered the army in 1771, and, after serving in the West Indies, rose to the rank of colonel, and became governor of Trinidad in 1797. His next service was the capture of Flushing, of which he was appointed governor in 1809. He afterwards distinguished himself in the Peninsular war at Badajoz, Vittoria, Ciudad Rodrigo, &c. He was killed at Waterloo, 1815.

Picton, a port of entry and capital of Prince Edward's county, Ontario, Canada, 40 miles S.S.W. of Kingston. Pop. 3500.

Picton, a town of New South Wales, 53 miles S.W. of Sydney. In the vicinity are Picton Lakes. Pop. 3500.

Pictou, a thriving commercial town and seaport in the northern part of Nova Scotia, on a safe and commodious harbour. Bituminous coal is mined and largely exported, and a beautiful sandstone is quarried. Pop. 3403.

Picts, the name given to the ancient Caledonians, who inhabited North Britain till the beginning of the 6th century, usually regarded as a Celtic race, though some consider them to have been not even Aryans, but Turanians. See *Scotland.*

Picts' Houses. See *Earth Houses.*

Picul, in China, a weight of 133⅓ lbs. It is divided into 100 catties or 1600 taels.

Picus, an old sylvan deity in Italy, who was represented with the head of a woodpecker (Latin, *picus*), and presided over divination. This is also the scientific name of a genus of woodpeckers.

Piddock. See *Pholas.*

Piedecuesta (pi-ā-de-kų-es'tá), a town of the republic of Colombia, on the Rio de Oro, with a university. Pop. 9015.

Piedmont (Italian, *Piemonte*), a department or territorial division of Italy, between Switzerland, Lombardy, Liguria, and France; area, 11,198 square miles; pop. 3,233,431. It forms the upper valley of the river Po, and derives its name, signifying 'foot of the mountain,' from its situation at the base of the loftiest ranges of the Alps, by which it is inclosed on all sides except towards the Lombard plain. It forms one of the most beautiful and fertile portions of Europe, commencing on the north, south, and west in majestic mountains, and thence descending in magnificent terraces and finely undulating slopes to the rich plains of the Po, to the basin of which it all belongs. It is divided into four provinces—Turin, Alessandria, Cuneo, and Novara. The chief town is Turin. See *Sardinian Monarchy, Savoy (House of)*, and *Italy.*

Piedra-Blanca, a town of the Argentine Republic, prov. Catamarca. Pop. 6000.

Pien'za, a small city of Central Italy, prov. Siena, with a cathedral, bishop's palace, Palazzo Piccolomini, town-house, &c. Pop. 1004.

Piepowder Court, or PIEPOUDRE COURT, a court formerly set up at fairs and markets in England for the summary administration of justice in cases arising there. It is also called the Court of Dusty Foot, which has the same meaning as piepowder (a corruption of the French *pied poudreux*).

Pier (Fr. *pierre*, a stone), in architecture, is the name applied to a mass of masonry between openings in a wall, such as doors, windows, &c. The solid support from which an arch springs or which sustains a tower is also called a pier. The term is also applied to a mole or jetty carried out into the sea, intended to serve as an embankment to protect vessels from the open sea, and to form a harbour.

Pierce, FRANKLIN, fourteenth president of the United States, born in New Hampshire 1804, died 1869. He was bred to the law; entered congress in 1833; served in the Mexican war; and in 1853 became president, being elected by the Democratic party.

Pie'rian, an epithet given to the Pierides or Muses, from the district of Pieria in Thessaly, which was sacred to them.

Pierre, BERNARDIN DE SAINT. See *Saint-Pierre.*

Pierre (pi-ār), ST., a small island near the southern coast of Newfoundland, forming with the adjacent Island of Miquelon a colony of France. The inhabitants subsist entirely by the cod-fisheries and the industries connected with them. The Islands of St. Pierre and Miquelon were first acquired by the French in 1763; and were finally confirmed to them at the general Peace of 1814. Area (of St. Pierre and Miquelon), 90 sq. miles; pop. 6300.

Pierre (pi-ār), ST., a town in the West Indies, capital of the Island of Martinique, on the north-west coast of the island. It has fine churches, a botanic garden, and is well fortified. It is a very active seaport. Pop. 18,000.

Pierrefonds (pi-ār-fōn), a village of France, dep. Oise, near Compiegne, remarkable for its castle, founded in 1390 and recently restored. Pop. 1800.

Pierre-les-Calais, ST. See *Calais.*

Pierrot (pi-er-rō), a comic character on the French stage, dressed like the harlequin, and playing the part of a cunning but cowardly rogue.

Piers Plowman. See *Langlande.*

Pietà, in painting and sculpture, a representation of the Virgin embracing the dead Christ. In St. Peter's at Rome is a Pietà by Michael Angelo.

Pietermaritzburg, capital of Natal, 45 miles inland from Durban, with which it is connected by a railway. It was founded in 1843, and named after two of the Boer leaders, Pieter Retief and Gertz Maritz. It is regularly built, with wide streets planted with trees, contains the governor's residence, and government buildings, &c. Pop. 14,429.

Pi'etism, in German theology the religious views of the *pietists*, a name originally applied in derision to some young teachers of theology at Leipzig, who began in 1689 to deliver ascetic lectures on the New Testament to the students and citizens. The idea of imparting theological instruction in a popular way came from their friend and teacher Spener (the German Fénelon), who had held religious meetings in Frankfort from the year 1670, at which the laity prayed, and were allowed to ask questions, &c. The Leipzig lectures were put a stop to as being hostile to good government, but the influence of the pietists led to the foundation (1695) of the University of Halle, which became the centre of evangelical religion in Germany. The leading adherents of Spener were appointed its first professors,

among them Francke, the founder of the celebrated Waisenhaus or orphanage at Halle. The pietists were noted for their preference of practical as opposed to doctrinal religion, but they never formed a separate sect. The Jansenism and Quietism of France, and the Methodism of England, sprang from sources similar to those of the German pietism.

Pietra-dura, a kind of mosaic executed in Italy, and especially at Florence, in hard stones, such as topazes, garnets, carnelians, rubies, &c.

Piezom'eter, an instrument for measuring the compression of water and other liquids under pressure. In Oersted's piezometer the pressure is gauged by the manometer, and the amount of compression indicated by mercury in a glass tube.

Pig. See *Hog.*

Pigafet'ta, ANTONIO, born at Vicenza towards the end of the 15th century, accompanied Magellan in the first circumnavigation of the globe (1519–22). He kept a journal of the voyage, of which a complete edition was first published only in 1800.

Pigeon, the common name of a group of birds, forming in some systems a section of the order of rasorial or gallinaceous birds, in others a distinct order. The pigeons or doves as a group have the upper mandible arched towards its apex, and of horny consistence; a second curve exists at its base, where there is a cartilaginous plate or piece through which the nostrils pass. The crop is of large size. The pigeons are generally strong on the wing. They are mostly arboreal in habits, perching upon trees, and building their nests in elevated situations. Both sexes incubate; and these birds generally pair for life; the loss or death of a mate being in many cases apparently mourned and grieved over, and the survivor frequently refusing to be consoled by another mate. The song consists of the well-known plaintive *cooing*. The pigeons are distributed in every quarter of the globe, but attain the greatest luxuriance of plumage in warm and tropical regions. The pigeon family is divided into various groups. The true pigeons or Columbidæ are represented by the stock-dove, the common wild pigeon, from which, it was once supposed, most of the beautiful varieties of the *Columbidæ*, which in a state of domestication are dependent upon man, derived their origin; but it is now believed the rock-dove is the parent stock. The passenger-pigeon is very abundant in North America. The numbers that sometimes move together are vast beyond conception. Millions of these pigeons associate together in a single roost. The house-pigeons, tumblers, fantails, pouters, carriers, and jacobins are the chief varieties of the rock-pigeon, and have been employed by Darwin (see his Origin of Species and his Animals under Domestication) to illustrate many of the points involved in his theory of 'descent by natural selection.' Other species of pigeons are the *Treronidæ* or fruit-pigeons of India, the Eastern Archipelago, and Australia; the *Gouridæ* or ground-pigeons, the largest of the group, including the crowned pigeon (*Goura coronāta*) of the Eastern Archipelago. See also *Carrier Pigeon, Passenger Pigeon, Turtle-dove*, &c.

Pigeon-berry. Same as *Pokeweed.*

Pigeon English, conjectured to be a form of 'business English;' a conglomeration of English and Portuguese words wrapped in a Chinese idiom, used by English and American residents in China in their intercourse with the native traders.

Pigeon-pea, the fruit of the leguminous shrub *Cajanus indicus*, a native of India, but now cultivated in tropical Africa and America. In India the pigeon-pea forms a pulse of general use. Called also *Angola Pea* and *Congo Pea.*

Pig-iron. See *Iron.*

Pigment-cell, in physiology, a small cell containing colouring matter, as in the choroid coat of the eye.

Pigments, materials used for imparting colour, especially in painting, but also in dyeing or otherwise. The colouring substances used as paints are partly artificial and partly natural productions. They are derived principally from the mineral kingdom; and even when animal or vegetable substances are used for colouring they are nearly always united with a mineral substance (an earth or an oxide). In painting the colours are ground, and applied by means of some liquid, which dries up without changing them. The difference of the vehicle used with the method of employing it has given rise to the modes of painting in water-colours, oil-colours, in fresco, in distemper, &c. For oil-painting mineral substances are more suitable than *lakes* prepared with minerals, because the latter become darker by being mixed with oil. The *lake* colours have tin or alum for their

basis, and owe their tint to animal or vegetable colouring substances. Indigo is a purely vegetable colour, as is also blue-black, which is obtained from burned vine-twigs. Ivory black is a purely animal colour, being nothing else than burned ivory. In staining porcelain and glass the metallic colours which are not driven off by heat and are not easily changeable are used.

Pigmy. See *Pygmy.*

Pignerol. See *Pinerolo.*

Pig-nut. See *Earth-nut.*

Pika, the calling-hare (*Lagomys*), an animal nearly allied to the hares, and forming the family Lagomydæ. It is found in Russia, Siberia, and North America, and is remarkable for the manner in which it stores up its winter provision, and also for its voice, the tone of which so much resembles that of a quail as to be often mistaken for it.

Pike, a genus of fishes belonging to the order Teleostei, and included in the Malacopterous division of the order. The pikes form the types of the family Esocidæ, in which group the body is lengthened, flattened on the back, and tapering abruptly towards the tail. One dorsal fin exists, this structure being placed far back on the body, and opposite the anal fin. The lower jaw projects. Teeth are present in plentiful array, and are borne by almost every bone entering into the composition of the mouth. The common pike (*Esox lucius*) occurs in the rivers of Europe and North America. It is fished chiefly for the sake of its flesh, which is accounted exceedingly wholesome. The pikes are very long-lived, and form the tyrants of their sphere, being the most voracious of fresh-water fishes. When fully grown the pike may attain a length of 5 or 6 feet, and there are numerous instances on record in which these fishes have greatly exceeded that length. The sea pikes (*Esox belone*), also known as gar-pikes, are also included in the family Esocidæ. (See *Gar-fish.*) The saury pike (*Scomberesox saurus*) resembles the gar-pike in general conformation, but possesses the dorsal and anal fins in the shape of a number of divided 'finlets.' The bony pike (*Lepidosteus osseus*) of North American lakes and rivers belongs to an entirely different order of fishes—that of the Ganoidei. See *Bony Pike.*

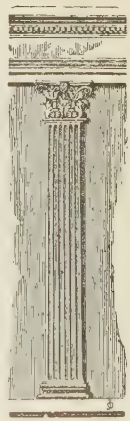
Pike, a sort of lance, a weapon much used in the middle ages as an arm for infantry. It was from 16 to 18 feet long, and consisted of a pole with an iron point. For some time every company in the armies of Europe consisted of at least two-thirds pike-men and one-third harquebusiers. Gustavus Adolphus omitted the pike-men in some regiments entirely. The invention of the bayonet drove the pike out of use.

Pike-perch (*Lucioperca*), a genus of fishes closely allied to the perch, but showing a resemblance to the pike in its elongated body and head. Like the pike, it is a dangerous enemy to other fresh-water fishes, but the flavour of its flesh is excellent. In Europe it occurs in two species. It also occurs in the fresh waters of North America, such as the great lakes, the Upper Mississippi, and the Ohio.

Pike's Peak, one of the highest summits of the Rocky Mountains (14,134 feet), in the centre of the state of Colorado. It was discovered by General Pike in 1806. It abounds in rich gold-bearing quartz, and has a meteorological observatory. A rack-rail line of railway, 9 m. long, to top of mountain, is operated during the summer months.

Pikul. See *Picul.*

Pilas'ter, a square pillar projecting from a pier or a wall to the extent of from one-fourth to one-third of its breadth. Pilasters originated in Grecian architecture. In Roman they were sometimes tapered like columns and finished with capitals modelled after the order with which they were used. See *Column.*



Pilaster—Corinthian.

Pilate, PONTIUS, the sixth Roman procurator of Judæa. He succeeded Valerius Gratus in A.D. 26. Nothing is known of his early history. He was a narrow-minded and impolitic governor, and at the very beginning of his term of office led to commotions among the Jews at Jerusalem. When Christ had been condemned to death by the Jewish priests, who had no power of inflicting capital punishments, he was carried by them to Pilate to be executed. Yielding to the clamours of the Jews the Roman governor ordered Jesus to be executed, but permitted Joseph of Arimathea to take his body and bury it. Pilate was afterwards removed from his office by Vitellius, prefect of Syria (A.D. 36), and, according to tradi-

tion, was banished by Caligula to Vienna (Vienne), in Gaul, where he is said to have died or committed suicide some years after.

Pila'tus, Mount, a mountain in Switzerland, on the borders of the cantons of Lucerne and Unterwalden. Its loftiest peak, the Tomlishorn, attains a height of 7116 feet. It is almost as great a favourite with mountain climbers as the Rigi on account of the imposing views of the Bernese mountain scenery obtained from various points. A railway to the summit was opened in 1889.

Pil'chard (*Clupea pilchardus*), a species of fishes included in the family and genus of the herrings (Clupeidæ), which they much resemble though rather smaller. They frequent the coasts of Britain all the year round. The usual spawning time is October. They are found in greatest plenty on the southern coasts of England, the Cornwall pilchard fisheries being those best known and most celebrated. Pilchards are chiefly consumed in Spain, Italy, and France during Lent and other fasting seasons. Many of the commercial 'sardines' are in reality young pilchards, the sardine (which see) being also included in the herring genus.

Pilcoma'yo, a river in South America, which rises in Bolivia, on the eastern declivities of the Andes, and falls into the Paraguay, near Asuncion, after forming the boundary between Paraguay and the Argentine Republic. Its entire length is between 1500 and 1600 miles. On account of its shallowness during the dry season and the great current in its narrow parts it does not appear likely to become usefully navigable.

Piles. See *Hemorrhoids.*

Piles, in works of engineering, are used either for temporary purposes or to form a basis for permanent structures. In the former case they are usually squared logs of wood sharpened at the point, which is sometimes protected with an iron shoe to enable it to penetrate the harder strata which it may meet with in being driven into the ground. The most usual purpose to which piles are applied in temporary structures is to make coffer-dams. The permanent purposes for which piles are employed are various. In many cases the object is to secure a firm foundation in a loose or swampy soil. In these cases the piles used are now often of cast-iron, sometimes solid and sometimes hollow. Piles are driven in by a heavy block raised and let fall alternately, this in extensive works being accomplished by means of steam machinery.

Pilewort. See *Celandine.*

Pilgrimage of Grace, an insurrectionary movement in the north of England, in 1536–37, consequent upon the proceedings of Henry VIII. in regard to the church. The insurgents demanded the fall of Cromwell, redress to the church, and reunion with Rome. Mustering to the number of 30,000, they marched upon York, and within a few days were masters of England north of the Humber. Henry temporized, promising a free parliament at York; but when the insurgents returned home all concessions were revoked, and a renewal of the revolt was suppressed with great rigour. Many perished by the block, the gibbet, and the stake.

Pilgrimages. The practice of making pilgrimages to places of peculiar sanctity is as ancient as it is wide-spread. The ancient Egyptians and Syrians had privileged temples, to which worshippers came from distant parts. The chief temples of Greece and Asia Minor swarmed with strangers. But it is in Christianity and Mohammedanism that the practice has attained its greatest development. The first Christian pilgrimages were made to the graves of the martyrs. By the end of the 4th and beginning of the 5th century the custom had become so general as to lead to abuses. Throughout the middle ages, and especially about the year 1000, the religious fervour of the people manifested itself in numerous pilgrimages, especially to Jerusalem. The outrages inflicted on the Christian pilgrims by the Saracens led to the Crusades, which were themselves nothing else than gigantic armed pilgrimages. The shrine of Our Lady of Loretto, near Rome, that of St. James of Compostella in Spain, of St. Martin of Tours in France, were all sacred spots to which, from the 10th to the 13th century, and even much later, pilgrims resorted in innumerable crowds; and from the end of the 12th century the shrine of St. Thomas Becket at Canterbury had the same honour in England. After the Reformation the practice of making pilgrimages fell more and more into abeyance, and the spirit which led to it seems almost to have become extinct among Christians, although there are still occasional outbursts of it among the Roman Catholics, as in the modern pilgrimages to Paray-le-Monial, Lourdes, Iona, and Holy Island. In the Greek church Mount Athos is the chief shrine of pilgrimage. For Mohammedans the great

place of pilgrimage is Mecca, which was the resort of Arabian pilgrims long before the time of Mohammed. Among the Hindus and the Buddhists also the practice of performing pilgrimages largely prevails.

Pilgrim Fathers, the name given to the English, Scotch, and Dutch Nonconformists who, sailing from Southampton in the *Mayflower*, landed at what is now Plymouth in Massachusetts, Dec. 1620, and colonized New England.

Pilibhît, a town in India, in the district of Bareilly, in the North-west Provinces, 30 miles north-east of Bareilly city, on the Desha river, the entrepôt for an extensive traffic between the upper and lower country. The most important industry is sugar refining. In 1740, it was seized by the Rohilla leader, Háfiz Rahmat Khán, who made it his capital. In the western outskirts stand his cathedral mosque and the remains of his palace. Pop. 29,721.

Pillar. See *Column.*

Pillar-saints. See *Stylites.*

Pillau (pil'ou), a fortified seaport of East Prussia, at the entrance of the Frisches Haff, 25 miles W.S.W. of Königsberg, with which it forms one port. Large vessels for Königsberg are partially unloaded at Pillau. Pop. 3434.

Pil'lory, a frame of wood erected on posts, with movable boards, and holes through

Pillory.

which were put the head and hands of a criminal for punishment. In this manner persons were formerly exposed to public view, and generally to public insult. It was a common punishment in Britain for forestallers, users of false weights, those guilty of perjury, forgery, libel, seditious writings, &c. It was abolished in 1837.

Pills, medicines made up in globules of a convenient size for swallowing whole, the medicine being usually mixed up with some neutral substance such as bread-crumbs, hard soap, extract of liquorice, mucilage, syrup, treacle, and conserve of roses. The coverings are liquorice powder, wheat flour, fine sugar, and lycopodium. In many cases pills are now enamelled or silvered, which deprives them of most of their unpleasantness. Pills are a highly suitable form for administering medicines which operate in small doses, or which are intended to act slowly or not to act at all until they reach the lower intestines, and in some other cases.

Pilot, a person qualified to navigate a vessel within a particular district. The pilots of the United Kingdom are formed into associations at different places by ancient charters of incorporation, or particular statutes. (See *Trinity House.*) The law relating to British pilots and pilotage is contained in various acts. By the existing law, oversea vessels must employ a pilot in those parts of the voyage where a pilot is employed by regulation or usage. A master refusing to take a pilot vitiates the insurance on the vessel; while a pilot refusing to perform the duty for which he is licensed renders himself liable to penalties. The master or owner of a vessel is not responsible for damage caused by the fault or incapacity of any qualified pilot, where the employment of such pilot is compulsory; but the pilot must not be interfered with in the discharge of his duties. Pilotage fees depend on the distance and the draught of water of the vessel piloted. Masters and mates passing the requisite examination are entitled to pilotage certificates to conduct their own vessels. Laws regulating pilotage have been enacted by the States of the American Union —this power being controlled by Congress. The pilot laws of the States are different, some being unjust and burdensome, especially as to sailing vessels; while others are fair and equitable. A sailing or steam-vessel engaged in foreign trade must pay for a pilot even when one is not employed. The compulsory pilotage system is being abolished in many large foreign seaports, without detriment to the general safety of navigation.

Pilot-fish (*Naucrătes* or *Scomber ductor*), a genus of Teleostean fishes included in the Scomberidæ or mackerel family, and sometimes included in the same genus (*Scomber*) as the mackerel itself. The pilot-fish was

Pilot-fish (*Naucrătes ductor*).

formerly supposed to act as a pilot to the mariner, and is still supposed to act as such to sharks. It often follows in the wake of ships for long distances, associating with sharks and devouring the refuse thrown overboard. The average length is about 12 inches. In general form it resembles the mackerel.

Pilo'ty, Karl, German painter, born at Munich 1826, died 1886. He studied at the Academy of Munich, and gained fame by his picture of 'The Founding of the Catholic League' (1854). In 1856 he was appointed a professor in the Munich Academy of Arts. He devoted himself chiefly to historical subjects, and among his works are: Seni by the dead body of Wallenstein; Nero among the Ruins of Rome; Mary Queen of Scotland receiving her Death Sentence; the Murder of Cæsar; Thusnelda in the Triumph of Germanicus; the Wise and Foolish Virgins; the Death of Alexander the Great. Piloty is reckoned the most remarkable representative of the realistic school of Germany.

Pilpay. See *Bidpai.*

Pilsen, a town in Western Bohemia, at the confluence of the Mies and Radbusa, 53 miles south-west of Prague. It consists of the town proper, with promenades on the site of the old ramparts, and of three suburbs. The principal buildings are the church (1292), town-house, real-school, and theatres. The chief article of manufacture and commerce is beer. Coal, iron, alum, &c., are worked in the neighbourhood. The second town of Bohemia, Pilsen dates from 1272. During the Thirty Years' war it was for a time the headquarters of Wallenstein. Pop. 46,817.

Pilum. See *Javelin.*

Pimelo'dus, a genus of malacopterygian abdominal fishes, found chiefly in South America, the Nile, and some of the eastern rivers, and supposed to abound in subterranean lakes, as one species (*P. cyclōpum*), 6 inches long, is sometimes ejected in thousands from the craters of volcanoes.

Pimen'to, or Pimenta. See *Allspice.*

Pim'pernel (*Anagallis*), a genus of plants belonging to the natural order Primulaceæ. The *Anagallis arvensis*, or field pimpernel, a beautiful annual, is commonly known in England (where the scarlet-flowered variety is by far the most common) as the 'shepherd's or poor man's weather-glass,' from the fact that its flowers do not open in rainy weather. The bog pimpernel (*Anagallis tenella*) grows in the drier parts of marshes in England. The blue and lilac varieties of the *Anagallis collīna*, originally a native of South Africa, have been introduced into gardens in Great Britain, where they have a fine effect. The water pimpernel is the *Veronica Anagallis;* the yellow pimpernel, *Lysimachia nemŏrum.*

Pimpinella. See *Anise.*

Pin, a piece of wire, generally brass, sharp at one end and with a head at the other, chiefly used by women in adjusting their dress. By the old methods of manufacture by hand, the distinct processes, from the straightening of the wire to the spinning and hammering of the head, were usually said to be fourteen. Among the most important improvements introduced in the fabrication of pins are the machines by which the head is formed from the pin itself, and the machine for sticking the pins in paper—both American inventions. Solid-headed pins, now universally used, were first made in 1824. The consumption of pins in the United States is estimated at thirty millions a day.

Pina Cloth, a costly fabric made in Manilla from the unspun fibres of the leaves of the cultivated pine-apple plant (*Ananassa sativa*). Its colour is almost white, but has a slight tinge of yellow in it. In spite of the delicacy of its texture it is remarkably strong. Its chief use is for making ladies' pocket handkerchiefs, but it is sometimes also used for dresses. It is frequently adorned with exquisite embroidery.

Pinacothek, or Pinakothek (Gr. *pinakothēkē*), a name sometimes applied in Germany to galleries of art, especially collections of paintings. The Pinacothek formed by Louis I. of Bavaria at Munich is particularly famous.

Pinckney, Chas. Cotesworth, statesman, was born in Charleston, S. C., in 1746. In the Revolutionary war he displayed resolution and intrepidity, and for two years

suffered rigorous confinement. In 1787 was member of the convention that framed the Constitution. As minister to France in 1796 he had occasion to make the declaration, "Millions for defence, but not one cent for tribute." "His love of honour was greater than his love of power, and deeper than his love of self." He died 1825.

Pindar (PIN'DAROS), the greatest of the lyric poets of Greece, born in Bœotia, in or near Thebes, of a noble family, about 522 B.C. At an early age he was instructed in music and poetry; and for the development of his poetical talent he was sent to Athens, where he became the pupil of Lasus of Hermione, the founder of the Athenian school of dithyrambic poetry. In after-life he showed himself a great admirer of Athens and the Athenians, who rewarded him for the honours he paid to them by making him a public guest of the city and giving him a present of 10,000 drachmas, and after his death erected a statue in his honour. He was held in great honour by many princes of Greek states, for whom he composed choral songs, and had close relations with Delphi. Little is known with certainty of his life; even the date of his death is doubtful. The most probable account appears to be that he died at the age of eighty, in which case his death would fall about 442 B.C. He practised all kinds of lyric poetry, and excelled equally in all. His works embraced hymns to the gods, pæans, dithyrambs, dancing and drinking songs, dirges, panegyrics on princes, and odes in honour of the victors in the great Grecian games, but the only poems of his which have come down to us entire belong to the last class, the Epinicia. Forty-five of the epinician odes of Pindar are still extant. Fourteen of these are in celebration of Olympic victors, twelve of Pythian, eleven of Nemean, and eight of Isthmian.

Pindar, PETER. See *Wolcot*.

Pin'darees (that is, *freebooters*), the name given in British India to the hordes of mounted robbers who for several years after 1812 infested Central India. They were descended mostly from the caste of Mohammedan warriors, which formerly received high pay from the Indian princes, and they were secretly excited by the Indian tributaries to attack the Company. In 1817 the British governor-general, the Marquis of Hastings, determined on the destruction of these robbers, whose force was estimated at 40,000 horse. Attacked on all sides, they were conquered and dispersed. Garrisons were placed in some fortresses, and the native states of the infested district were formally taken under British protection.

Pind Dadan Khan, a prosperous commercial town, Jhelum district, Punjab, British India, near the north bank of the Jhelum River, with a trade in salt. Pop. 16,724.

Pindus, the ancient name of the principal mountain range of Northern Greece, forming the watershed of the country and the boundary between Thessaly and Epirus. It was, like Helicon and Parnassus, a seat of Apollo and the Muses.

Pine, the popular name of trees of the genus *Pinus*, natural order Coniferæ, which is divided into two sub-orders, namely, 1. *Abietineæ*, the fir tribe; and 2. *Cupressineæ*, the cypress tribe. The pines belong to the former section, and are distinguished from the spruce, larch, fir, cedar, &c., chiefly by having persistent leaves in clusters of two to five in the axils of membranous scales. All the European species, except *P. Cembra*, have only two leaves in a sheath; most of the Asiatic, Mexican, and Californian kinds have three, four, or five leaves, and those of the United States and Canada have generally three. The cones also afford an important ready means of distinction and classification. The Scotch pine or fir (*P. sylvestris*) is a tall, straight, hardy tree, from 60 to 100 feet high; a native of most parts of Europe, flowering in May and June, and having many varieties. The leaves are rigid, in pairs, somewhat waved and twisted; the lower branches are somewhat pendant; the bark is of a reddish tinge, sometimes rough and furrowed. The leaves are distinguishable from those of all other pines in which they occur in pairs by their glaucous hue, especially when young. The Scotch pine almost always occurs in masses; it is considered full grown and fit to be cut down for timber in fifty or sixty years; but in the north of Scotland, where pine forests grew to perfection in former times, the tree continued to increase in bulk for three or four centuries. The tree is most abundant in the north of Europe, between lat. 52° and 65°. There are extensive forests of it in Russia, Poland, Sweden, Norway, Germany, the Alps, the Pyrenees, and the Vosges. In Scotland it grows at the height of 2700 feet on the Grampians. The Corsican pine (*P. Laricio*) grows to a height of from 80 to 100 feet, and in the island of Corsica it is said to reach an altitude of 140 to 150 feet. The pinaster, or

cluster pine (*P. pinaster*), is indigenous to the south of Europe, to the west of Asia, the Himalayas, and, it seems, even to China. It is a large, handsome, pyramidal tree, varying from 40 to 60 feet in height. Its cones point upwards, in star-like clusters, whence the name of pinaster or star pine. In France, especially between Bayonne and Bordeaux, it covers immense tracts of barren sand, in which it has been planted to prevent the sand from drifting. The stone pine (*P. pinĕa*) is a lofty tree in the south of Europe, where it is a native; its spreading head forms a kind of parasol; the trunk is 50 or 60 feet high, and clear of branches. In Britain the stone pine seldom exceeds the size of a large bush, although specimens have reached a height of 30 and 40 feet. Sabine's pine (*P. Sabiniāna*) was discovered in California in 1826. The leaves are in threes, rarely in fours, from 11 to 14 inches long; the trees are of a tapering form, straight, and from 40 to 120 feet high, with trunks from 3 to 12 feet in diameter. The Cembran pine (*P. Cembra*) is a native of Switzerland and Siberia. The red Canadian pine (*P. resinōsa*), or yellow pine, inhabits the whole of Canada from the Atlantic to the Pacific, and is also found in the northern and eastern parts of the United States. The trunk rises to the height of 70 or 80 feet by about 2 in diameter at the base, and is chiefly remarkable for its uniform size for two-thirds of its length. The wood is yellowish, compact, fine-grained, resinous, and durable. The true yellow pine (*P. variabĭlis*) rises to the height of 50 or 60 feet, by 15 or 18 inches in diameter at base. The cones are small, oval, and armed with fine spines. The timber is largely used in shipbuilding and for house timber. The Labrador or Banks's pine (*P. Banksiāna*) is usually a low straggling tree, growing among barren rocks to a height of from 5 to 8 feet, but may attain three times that height. The cones are recurved and twisted; and the leaves are regularly distributed over the branches. In Nova Scotia and the state of Maine it is known as the scrub pine, and in Canada as the gray pine. The other American pines are the Jersey pine (*P. inops*), the trunk of which is too small to be of any utility in the arts; the pitch pine (*P. rigida*), which is most abundant along the Atlantic coast, and the wood of which, when the tree grows in a dry, gravelly soil, is compact, heavy, and contains a large proportion of resin; the loblolly pine (*P. tæda*), the timber of which decays speedily on being exposed to the air; the long-leaved pine (*P. palustris*), which abounds in the lower part of the Carolinas, Georgia, and Florida, furnishing resin, tar, pitch, and turpentine, and timber which is hardly inferior to the white oak in naval architecture; the Weymouth pine (*P. strobus*), the timber of which, though not without essential defects, is consumed in much greater quantities, and for a far greater variety of purposes, than almost any other; and Lambert's pine (*P. Lambertiana*), which grows between the fortieth and forty-third parallels of latitude, and about 100 miles from the Pacific. It is of gigantic size, the trunk rising from 150 to upwards of 200 feet, and being from 7 to nearly 20 feet in diameter.

Pine'al Gland, in anatomy, is a body (not properly a gland) forming part of the brain. It is about the size of a pea, and is connected with the cerebrum at its base by four peduncles or stalks and by some few cross fibres. Its use is not known. It was considered by the ancients to be the seat of the soul.

Pine-apple (*Ananassa satīva*), a plant belonging to the natural order Bromeliaceæ, much esteemed for its richly-flavoured fruit, which somewhat resembles a pine-cone. A native of tropical America, it is now naturalized in many hot countries, and is also cultivated in hothouses. The common pine-apple plant yields the fibre of which, in Manilla, the beautiful pina cloth is made. (See *Pina Cloth.*) The fibre is also used for textile purposes in China and India.

Pine Bluff, Jefferson co., Ark., in cotton-producing section of the State, has a large cotton trade. Pop. 1890, 9952.

Pine-chafer, or PINE BEETLE (*Hylophăgus piniperda*), a species of beetle which infests Scotch pines. It feeds on the young shoots of these trees and eats its way into the heart, thus converting the shoot into a tube.

Pine-finch, or PINE-GROSBEAK (*Pinicŏla*, or *Pyrrhŭla enucleātor*), a genus of conirostral perching birds or Insessores, belonging to the sub-family of the bullfinches (*Pyrrhulinæ*). It is of larger size than the common bullfinch, and measures from 8 to 9 inches in length. It occurs in the Arctic and northern regions of both Old and New Worlds. It is more rarely found in the temperate portions of Europe. Its song notes are agreeable, and its flesh is esteemed in Russia.

Pinel', PHILIPPE, the Howard of the insane, was born in 1745, at St. André, in the French department of Tarn, and studied at Toulouse (where he took his doctor's degree in 1773) and Montpellier. In 1778 he went to Paris, and in 1791 came into notice by his treatise Sur l'Aliénation Mentale. In the following year he was made directing physician at the Bicêtre, and in 1794 at Salpêtrière. By his writings and by his management of these two asylums, in which he introduced the humane treatment of the insane, Pinel laid the foundations of the great reform that has been effected in treating mental diseases. He died at Paris in 1826.

Pine-resin, a resin contained in the juice which exudes from pines, firs, and other coniferous trees. These resins generally contain oxygen with volatile oils, and sometimes acid bodies.

Pine'ro, ARTHUR WING, actor and dramatist, son of a solicitor, was born in London in 1855, and made his *début* upon the stage at Edinburgh in 1874, subsequently joining the Lyceum and Haymarket companies. He is the author of several successful plays, including The Money Spinner, The Squire, Sweet Lavender, The Profligate, &c.

Pinero'lo (French, *Pignerol*), an ancient city of Italy, province of Turin, 21 miles south-west of the city of that name, at the mouth of the Val Clusone. It has a cathedral, bishop's palace, lyceum, technical school, &c. The manufactures are chiefly cotton, woollen, and silk goods. It belonged to Savoy from 1042, but the French held it for a series of years on several occasions; and its citadel was at one time the prison of the Man with the Iron Mask. Pop. 12,003.

Pine Wool, the fine fibres of the leaves of the pine-tree. The preparation of this material is chiefly carried on in Germany and Sweden. It is used for making wadding, a coarse kind of blanket, stuffing cushions, mattresses, &c.

Piney Tallow, called also Malabar tallow, is a fatty substance resembling wax, obtained by boiling with water the fruit of the *Vateria Indica*, a tree common on the Malabar coast. It forms excellent candles.

Piney Varnish, a resin used as a varnish, obtained from two trees of S. India and Ceylon, *Vateria indica* and *V. acuminata*. It is known also as piney resin, white dammar, and Indian copal, and is got by making incisions on the bark of the tree or into its substance. It is soluble in turpentine and drying oils.

Pinguic'ula, a genus of plants of the natural order Lentibulariaceæ, with rosettes of fleshy radical leaves, and solitary purple, violet, or yellow flowers. See *Butterwort*.

Pinion, in machinery, a small wheel which plays in the teeth of a larger one, or sometimes only an arbor or spindle in the body of which are several notches forming teeth or leaves, which catch the teeth of a wheel that serves to turn it round.

Pink (*Dianthus*), a genus of plants belonging to the natural order Caryophyllaceæ. More than 100 species are known, all, with perhaps one or two exceptions, natives of the northern and temperate parts of the European continent. Their roots are annual or perennial; the stems herbaceous and jointed; the leaves opposite and entire, and the flowers terminal, aggregate, or solitary, and always beautiful. The clove pink or carnation, and the garden pink, of which there are many varieties, are familiar species.

Pinkerton, JOHN, F.S.A., a Scottish antiquary, born at Edinburgh in 1758. He was articled to a writer to the signet, but in 1780 went to London to devote himself to literature, and by his Letters on Literature obtained the acquaintance of Horace Walpole. His more valuable publications are: Ancient Scottish Poems, from the Manuscript Collection of Sir Richard Maitland of Lethington, with Notes and a Glossary (1786); Inquiry into the History of Scotland preceding the Reign of Malcolm II. or 1056 (1790), containing a curious discussion of the 'Pictish question;' The Medallic History of England; Scottish Poems, reprinted from scarce editions; and a General Collection of Voyages and Travels in 19 large volumes. He died at Paris, March 10, 1826.

Pin-money, an annual sum of money, sometimes provided for in a marriage settlement, to be paid by the husband to the wife for her separate use, and to be applied in the purchase of apparel, ornaments for her person, or for private expenditure.

Pinna, or WING SHELL, a genus of Lamellibranchiate Mollusca included in the family Aviculidæ. The genus is represented by the *Pinna pectinăta* of the British coasts, by the *P. nobilis* of the Mediterranean Sea, by the *P. bullăta*, *P. rudis*, *P. nigrīna*, and by other species. Some species attain large dimensions, being as much as 2 feet long. The 'byssus,' by which they adhere to rocks, is remarkably long, and of strong silky texture, and is capable of being woven into

cloth upon which a very high value is set. This manufacture was known to the ancients, and is still practised in Italy to some extent.

Pin'nace, a small vessel used at sea, having sails and oars, and two or three masts schooner-rigged. One of the boats of a man-of-war, used to carry the officers to and from the shore, is also called the pinnace. It is usually rowed with eight oars.

Pinnacle, Trinity Church, Cambridge.

Pinnacle, in architecture, any lesser structure that rises above the roof of a building, or that caps and terminates the higher parts of angles or of buttresses. The application of the term is now generally limited to an ornamental pointed mass rising from angles, buttresses, or parapets, and usually adorned with rich and varied devices. They are usually square in plan, but are sometimes octagonal, and in a few instances hexagonal and pentagonal. The tops are generally crocketed, and have finials on the points.

Pinnate, in botany, formed like a feather. A pinnate leaf is a species of compound leaf wherein a single petiole has several leaflets or pinnules attached to each side of it.

Pinnate Leaf.

Pinnigra'da, or PINNIPEDIA, a section of the carnivorous order of mammals, in which the fore and hind limbs are short, and are expanded into broad webbed swimming paddles. The section comprises the seals and walruses.

Pinos, ISLA DE. See *Isla de Pinos.*

Pinsk, a town of Western Russia, in the government of Minsk, on the navigable river Pina. It stands among marshes, and is built of wood. It has an active transit trade. Pop. 26,251.—The Pinsk Marshes, which cover an immense extent of country, are now in process of being drained.

Pint, a measure of capacity used for both liquids and dry goods; it is the eighth part of a gallon, or 34·65925 cubic inches. The Scotch pint was equal to 3·0065 imperial pints.

Pintado. See *Guinea-fowl.*

Pintail Duck, a genus of ducks, so named from the elongated form of the tail-feathers. In size the common pintail duck (*Dafila acūta*) is equal to the mallard. These birds are found on the British coasts in summer, but migrate southwards in winter. They are common in the Mississippi Valley, and they occur on the Mediterranean coasts, in the Gulf of Mexico, in the West Indian Islands, and in Africa. They breed in confinement, and the flesh is savoury.

Pinto, MAJOR SERPA, Portuguese traveller, born in 1846, and educated at the Royal Military College, Lisbon; entered the Portuguese army in 1863. In 1877–79 he crossed Africa from Benguela to Durban, and described his journey in a work entitled How I Crossed Africa (London, 1881), which procured him many honours, especially from geographical societies. He has led several exploring expeditions, and his proceedings in the Zambesi district led in 1890 to a vigorous and successful protest by Britain against the claims of Portugal in that quarter.

Pinturicchio (pin-tu-rik'yō; 'the little painter'), an eminent Italian painter of the Umbrian school, whose real name was BERNARDINO DI BETTO, was born at Perugia in 1454, and died at Siena in 1513. He lived for a time at Rome, and while there was engaged on the frescoes of the Sixtine Chapel, being at this time under the influence of Perugino. His chief work was a series of mural paintings illustrating the life of Pope Pius II. (Æneas Silvius), in the cathedral library at Siena. There are also fine frescoes by him in the Buffalini Chapel of the church St. Maria in Araceli, Rome. He left many exquisite altar-pieces and other works in tempera; he never painted in oil.

Pinus. See *Pine.*

Pinzon', a family of Spanish navigators, natives of Palos, who were associated with Columbus in the discovery of America.—MARTIN ALFONSO, the eldest, was of great assistance to Columbus in fitting out his fleet, and in the voyage commanded the *Pinta.*—VICENTE YAÑEZ, his brother, commanded the *Niña* in the first voyage of Columbus.—FRANCISCO MARTIN, the third brother, was pilot of the *Pinta* in the first voyage of Columbus. From him descended the noble Spanish family of Pinzon.

Piombi'no, a town of Italy, province of Pisa, on the sea-coast opposite the island of Elba. It has old fortifications, a good harbour, and manufactures of Bessemer steel and military projectiles. Pop. 2763. Piom-

bino was formerly the capital of a small principality.

Piombo, Sebastiano Luciani del, a celebrated painter, born at Venice in 1485. He studied under Giovanni Bellini and Giorgione, whose fine colouring he imitated. Coming to Rome about 1512, he was induced by Michael Angelo to enter into rivalry with Raphael. When Raphael painted his celebrated Transfiguration, Sebastiano attempted to surpass it by painting the Raising of Lazarus, which is considered his greatest work, and is now in the National Gallery, London. Other important works are The Scourging of Our Lord, and A Holy Family. His chief merit, however, lay in single figures and portraits, such as his Clement VII. He was high in favour with Clement, who created him keeper of the papal seals. From this circumstance he derived his surname *Del Piombo*, the seals attached to the papal bulls being at that time of lead (*piombo*). He died in 1547. He preferred oil painting to fresco, and some of his later works are executed on slate.

Pioneers', labourers attached to an army for the making and repairing of roads, digging trenches, and preserving cleanliness in the camp when stationary, &c. A number of men are now attached to each corps as a permanent body of pioneers.

Piotrkov, a town of Russian Poland in the government of same name, one of the oldest towns of Poland. It was at one time the seat of the Polish diet, and the kings were elected here. Pop. 24,866.—The government has an area of 4729 sq. miles. It is moderately fertile, and has considerable manufactures of cottons and woollens. Pop. 1,061,101.

Piozzi, Hester Lynch Salusbury, an English authoress, the daughter of John Salusbury of Bodville, Carnarvonshire, was probably born in 1741, died at Clifton 1821. Early in life she was distinguished by her beauty and accomplishments. In 1763 she was married to Henry Thrale, a wealthy brewer of Southwark, London, which borough he then represented in parliament. Soon after her marriage she gathered round her a brilliant circle, including above all Dr. Johnson, who lived with the Thrales for sixteen years. Mr. Thrale dying in 1781, his widow, who was the mother of four daughters, married in 1784 Piozzi, a Florentine music-master, then resident in Bath. This alliance was keenly resented by all her friends, and Johnson entirely gave up her society. Her Anecdotes of Dr. Johnson appeared in 1786, and her Letters to and from Dr. Johnson in 1788. She also wrote a few poems, an autobiography, &c.

Pipa, a genus of toads, of which the best known species is the *Pipa americana* of Surinam and Brazil, popularly designated the Surinam toad. The tongue and teeth are wanting in this family. The pipa is

Pipa Toad (*P. surinamensis*).

one of the most repulsive looking of the toads, and is noted as exemplifying, in the case of the female animals, an anomalous mode of developing the eggs and young. A number of pits or depressions termed 'dorsal cells' appear to be formed on the back of the female pipas at the breeding season. In each cell an egg is deposited, the eggs being first deposited by the female in water after the usual method, and being impregnated by the male, who then collects the eggs and places them in the female's back. Each cell appears to be closed by a lid-like fold, and within the cells the eggs are hatched and the young pass their tadpole state.

Pipe, a wine measure, usually containing very nearly 105 imperial or 126 wine gallons. Two pipes or 210 imperial gallons make a tun. In practice, however, the size of the pipe varies according to the kind of wine it contains. Thus a pipe of port contains (about) 138 wine-gallons; of sherry, 130; of Madeira, 110, &c.

Pipe, a tube for the conveyance of water, steam, gas, or other fluid, used for a great variety of purposes in the arts and in domestic economy. The materials of which pipes are made are also very various, wood, stone, earthenware, iron, lead, copper, leather, gutta-percha, &c., being all employed. Drainage and sewerage pipes of great strength and size (measuring from 1 or 2 up to 54 inches in diameter) are now usually made of fireclay, glazed on their outer and inner sur-

faces. Large iron pipes are usually cast, and are used for the supply of water and gas. A great proportion of the manufacture of cast-iron pipes is carried on in Scotland.

Pipe Roll Society, an English society instituted for the publication of the Pipe Rolls, or Great Rolls of the Exchequer. These rolls, which relate to all matters connected with the revenue of the crown, crown lands, &c., are preserved in the Record Office. The society was established in 1883.

Pipe, TOBACCO, a bowl and connecting tube, made of baked clay, wood, stone, or other material, and used in smoking tobacco. The cheap pipes in common use throughout Great Britain are made of a fine-grained white plastic clay, found chiefly in the Isle of Purbeck in Dorsetshire, and at Newton Abbot in Devonshire. The chief processes in the manufacture of clay pipes are moulding and baking. Finer and more expensive pipes are made of meerschaum, a somewhat plastic magnesian stone of a soft greasy feel. Meerschaum pipe making is carried on to the greatest extent by the Germans, and Vienna may be said to be the centre of the manufacture. Sometimes the bowl alone (which is frequently artistically carved) is of meerschaum, the stem being of wood, the best sorts of which are got from the young stems of the Mahaleb cherry, grown near Vienna, the mock orange of Hungary, and the jessamine sticks of Turkey. The stem, whether of the same material as the bowl or of wood, is usually provided with a mouth-piece of ivory, silver, or amber, the last being preferred. Briar-root pipes, with the bowl and stem of one piece of wood, and provided with amber, ivory, or bone mouth-pieces, are now very common. They are made of the roots of a large variety of heath (Fr. *bruyère*). Many Germans and Dutchmen prefer pipes with porcelain bowls, which are sometimes beautifully painted in the style of fine chinaware painting. The Eastern hookah is a pipe of great size, the bowl of which is set upon an air-tight vessel partially filled with water, and has a small tube which passes down into the water; the long flexible smoking-tube is inserted in the side of the vessel, and the smoke is made to pass through the water, being thus cooled and deprived of some noxious properties. Upon the American continent pipes have been in use from a very remote period. Indian pipes, with elaborately-carved soapstone bowls and ornamented wooden stems, or entirely of baked clay, have been found in the ancient mounds of the West, together with other relics of an unknown race. See *Calumet*.

Pipe-clay, a fine white clay which is used for making tobacco pipes and articles of pottery, also for cleaning soldiers' belts, &c. See *Clay* and *Pipe* (*Tobacco*).

Pipe-fishes (*Syngnathus*), a genus of fishes included in the sub-order Lophobranchii and nearly allied to the curious little fishes popularly known as 'sea-horses' (see *Hippocampus*). They are distinguished by a long and

Great Pipe-fish (*Syngnathus acus*).

tapering body, and by jaws united to form a tube or pipe, bearing the mouth at the tip. The *Syngnathus acus* is one of the most familiar species. It averages 20 inches in length. The largest of the pipe-fishes is said to attain a length of 3 feet. A very remarkable circumstance in connection with the pipe-fishes consists in the males of some species possessing a pouch-like fold, situated at the base of the tail, in which the eggs are contained after being extruded from the body of the females, and in which the young, after hatching, continue to reside for a time The name pipe-fish is also applied to the members of the genus *Fistularia*, included in the Acanthopterous division of the Teleostei. The bones of the face are prolonged to form a tubular structure, at the extremity of which the mouth opens. The *Fistularia tabacaria* of the Antilles, averaging about 3 feet in length, represents this genus.

Pipera'ceæ, the peppers, a natural order of shrubby or herbaceous exogenous plants, inhabiting the hottest parts of the globe, particularly India and South America. The general properties of the order are aromatic, pungent, and stimulant. The dried unripe fruits of *Piper nigrum* constitute black pepper. (See *Pepper*.) The fruit of *Cubeba officinālis*, a climbing plant of Java and other Indian islands, is the Cubeb pepper. (See *Cubebs*.) The leaves and unripe fruit of *Piper angustifolium* constitute the aromatic, fragrant, and astringent substance

called *matico* or *matica*, which has been recommended for checking hemorrhage. The leaves of *Piper Betle* (*Chavica Betle*) are chewed in the East as a means of intoxication. (See *Betel.*) The root of *Macropiper methysticum* is the *kava* of the South Sea Islanders, and is used in the preparation of a stimulating beverage.

Pipette', an instrument used by chemists, druggists, &c., consisting of a glass tube with a bulging expansion about the middle, into which a certain quantity of liquid may be sucked by the mouth, so as to be transferred from one vessel to another.

Piping-crow, a bird of New South Wales, remarkable for its musical powers, and for its power of mimicking the voices of other birds. It is the *Barita tibicen*, and by some naturalists is placed among the shrikes (Laniidæ), by others among the crows (Corvidæ).

Pipistrelle (*Vespertilio Pipistrella*), the familiar little bat which makes its appearance, and flits about during twilight. It is of small size, and possesses a mouse-like body covered with hair, from which resemblance its popular name of Flitter-mouse has been derived. It passes the winter, like most other bats, in a state of torpidity; but appears to hybernate for a shorter period than other and larger species.

Pipit, or TITLARK (*Anthus*), a genus of perching-birds possessing striking affinities with the larks, which they resemble in the large size of the hinder claw, but commonly classed with the wagtails, which they closely resemble in their habits of running swiftly on the ground. The meadow pipit or titlark (*Anthus pratensis*) is the commonest British species. The shore pipit, or rock lark (*A. petrōsus*), frequents the sea beach, and feeds on molluscs and crustacea. The tree pipit or titlark (*Anthus arborĕus*) is a summer visitant only in the British Isles. All the pipits build their nests on the ground. The song in all consists of a clear, simple note. The *Anthus ludovicianus*, 6 to 7 inches long, is common in North America.

Pippin, the name given to a certain class of dessert apples, probably because the trees were raised from the pips or seeds, and bore the apples which gave them celebrity without grafting. They seem to have been introduced into Great Britain from France, and were little known there until about the end of the 16th century. The Ribston, Golden, and Newton Pippin are favourite varieties, well known in the United States.

Pippin. See *Pepin.*

Pipra, a genus of passerine birds which inhabit South America. See *Manakin.*

Piqua, town of Miami county, Ohio, United States, on Miami River, and Miami and Erie Canal, 90 miles north-east of Cincinnati. Pop. 1890, 9090.

Piquet', a game at cards played between two persons with thirty-two cards, all the plain cards below seven being thrown aside. In playing, the cards rank in order as follows: the ace (which counts eleven), the king, queen, and knave (each of which counts ten), and the plain cards, each of which counts according to the number of its pips. The player who first reaches 100 has the game. The score is made up by reckoning in the following manner:—Carte blanche, the point, the sequence, the quatorze, the cards, and the capot. Carte blanche is a hand of twelve plain cards, and counts ten for the player who holds it. The point is the suit of highest value, the value being determined by the number it makes up when the cards held are added together. The sequence is composed of a regular succession of cards in one suit. The quatorze is composed of four aces, four kings, four queens, four knaves, or four tens, and counts fourteen. The winner of the greatest number of tricks counts ten in addition (the 'cards'), if he holds all the tricks he counts forty in addition (the 'capot'). If a player scores twenty-nine in hand and one for the card he leads, before his opponent counts anything, he at once adds thirty to his score; this is called 'pique.' Should a player score thirty by the cards in his hand, by scores that reckon in order before his adversary can count, he obtains the 'repique,' which enables him to add sixty to his score. The scores are recorded according to the following table of precedence: 1, carte blanche; 2, point; 3, sequences; 4, quatorzes and trios; 5, points made in play; and 6, the cards. If one player scores a hundred before the other obtains fifty he wins a double.

Piqué-work, a fine kind of inlaid work, resembling Buhl-work (which see), but much more expensive and elaborate, the inlay being minute pieces of gold, silver, and other costly materials.

Pi'racy consists in committing those acts of robbery and depredation upon the high seas, or other places where the admiralty has jurisdiction, which, if committed upon land, would have amounted to felony only.

This is substantially the definition of this offence by the law of nations, which, on conviction, is punished with death in the U. States. It is an offence against the universal law of society, a pirate being, according to Coke, *hostis humani generis*. Piracy in the common sense of the word, is distinguished from privateering by the circumstance that the pirate sails without any commission, and under no national flag, and attacks the subjects of all nations alike; the privateer acts under a commission from a belligerent power, which authorizes him to attack, plunder, and destroy the vessels which he may encounter belonging to the hostile state.

Piræ'us (Greek, *Peiraieus*), the principal port of both ancient and modern Athens, is situated about 5 miles from that city, on a peninsula. It has three harbours: two on the east side, anciently named Zea (now Stratiotiki) and Munychia (now Phanari), and one on the west side, called simply Piræus, or the Harbour, the largest of the three. The Piræus was anciently connected with Athens by walls known as the Long Walls. When Greece was liberated from Turkish rule the Piræus was merely a scene of ruins. Since then a flourishing industrial and trading town has grown up, which is connected with Athens by a railway. Pop. 1889, 34,327.

Pirai, or PIRAYA, the *Serrasalmo Piraya*, a voracious fresh-water fish of tropical America. It is 3 or 4 feet in length, and its jaws are armed with sharp lancet-shaped teeth, from which cattle when fording rivers sometimes suffer terribly.

Pirane'si, GIOVANNI BATTISTA, an Italian architect, engraver, and antiquary, was born at Venice in 1720, but passed the greater part of his life at Rome. His chief work, the Antiquities of Rome, was in 29 vols., with about 2000 copper plates giving views of Rome and its buildings. His representations are not always faithful, on account of the scope which he gave to his imagination. He died in 1778.

Pira'no, an Austrian seaport in Istria, near the head of the Adriatic, 13 miles south-west of Trieste. There is good anchorage for the largest vessels in the well-sheltered roadstead. The principal objects of commerce are wine and olive-oil. Pop. 9419.

Pir'masens, a town of Bavaria, in the Palatinate, 22 miles west-south-west of Landau. It is well built, has a good town-house, and manufactures of shoes, musical instruments, leather, machinery, &c. Pop. 1890, 21,041.

Pirna, a town of Saxony, 10 miles from Dresden, on the right bank of the Elbe. It has manufactures of stoneware, chemicals, cigars, beer, &c.; and a considerable trade on the Elbe. Pop. 11,898.

Piron (pē-rōn), ALEXIS, a French wit, poet, and dramatist, born at Dijon in 1689. He studied law at Besançon; but having gone to Paris he wrote for the Theatre of the Comic Opera, and his first piece was Arléquin Deucalion, composed in two days. His success induced him to persevere, and after writing several pieces, he produced in 1738 his *chef-d'œuvre*, Métromanie, a comedy which Laharpe characterizes as excelling in plot, style, humour, and vivacity almost every other composition of the kind. Piron afterwards wrote Fernand Cortes, a tragic drama, and some other pieces, which obtained some success. He died in 1773.

Pisa (the ancient *Pisæ*), a town of Northern Italy, capital of the province of the same name, 6 miles from the Mediterranean, and 44 miles west of Florence, on both banks of the Arno, here crossed by three stone bridges for general traffic, and one carrying the railway. It is surrounded by walls and ditches, and defended by a citadel, the fortified circuit having a length of nearly 6 miles, much of the space inclosed being unoccupied. The river is lined by handsome quays on both sides (known as the Lungarno); the streets are spacious and well paved; and the houses are remarkable for the profusion with which marble has been employed in their construction. In the north-west part of the city is a remarkable group of buildings consisting of the Duomo or Cathedral, the Baptistery, the famous 'Leaning Tower,' and the Campo Santo. The Cathedral, begun in 1063, consecrated in 1118, is one of the noblest ecclesiastical structures of Italy, built of marble, in the form of a basilica, with a rich façade and a dome of peculiar shape; the Baptistery, begun in 1153, and finished in 1278, is a large rotunda, adorned externally by a series of arcades with decorated canopies, and crowned by a dome of peculiar design, 190 feet high; the Campanile or 'Leaning Tower' is of cylindrical shape, built of white marble, and has the whole exterior enriched by a succession of arcades extending from base to summit: its height is 179 feet, and it deviates 13 feet from the per-

pendicular. The Campo Santo, or cemetery, is the most remarkable structure of the kind in existence, consisting of a court surrounded by arcades of white marble, adorned with sculptures and frescoes, by the earlier Italian masters, and full of remarkable monuments. Other edifices are the town-house (Palazzo del Commune); the court-house (Palazzo Pretorio); and the university, anciently famous, and still one of the most celebrated in Italy. The manufactures consist chiefly of silk, woollen, and cotton goods. The population, which reached 150,000 when the city was in its zenith, is now only 37,704. The province of Pisa has an area of 1180 square miles, and a population of 283,269.—Pisa was an ancient Etrurian city, and one of the twelve cities of the confederation. In 180 B.C. it became a Roman colony. About the beginning of the Christian era it was a flourishing city. On the fall of the Roman Empire it was pillaged by the Goths, and afterwards subjected by the Longobards. In the 10th century it had succeeded in taking a lead among the Italian states; but, after protracted and unsuccessful wars with Genoa at the end of the 13th, and with Florence at the end of the 15th century, it was finally compelled by famine to submit to the Florentines (June 8, 1509), and thus ceased for ever to be independent. On the ruins of Pisa was founded the power of the Grand-duchy of Tuscany.

Pisa, Council of, a general council of the Roman Catholic Church, held to consider the pretensions of the rival popes of Avignon and of Rome, opened 25th March, 1409. The rival popes, Benedict XIII. (of Avignon) and Gregory XII. (of Rome) were summoned to appear within a stated period, but refused to comply. After mature deliberation both popes were formally deposed, and Cardinal Pietro Philargi, archbishop of Milan, was elected. The authority of the council was not, however, generally recognized, and it was not until 1417 that the schism can be said to have terminated.

Pisa'no, Niccolò, Italian sculptor and architect, born at Pisa about 1205, spent the most of his life there, and died in 1278. He holds an important place in the history of Italian art, inasmuch as his works presented a sudden and new development and far surpassed those of his immediate predecessors. Among his famous works are the reliefs of the baptistery of Pisa, the choir of the cathedral of Siena, and the beautiful sarcophagus of St. Dominic in Bologna. His chief architectural works are churches in Pisa, Pistoja, and Volterra.

Pisces, or Fishes. See *Ichthyology*.

Pisces (the Fishes), a sign of the zodiac, which is entered by the sun about the 19th of February. The constellation which occupies the zodiacal region corresponding to the sign has the same name; it contains some interesting double stars.

Pisciculture, the breeding, rearing, preservation, feeding, and fattening of fish by artificial means. Pisciculture has been practised from very remote ages, having been in use in ancient Egypt, and followed in China in early times on a very large scale. The art, so far as the perfecting of natural conditions under which fish live and thrive, without interfering directly with the ordinary processes of nature, has thus always been more or less practised. But the discovery that the ova of fish can be taken from the body of the female parent, impregnated with the male milt and hatched in tanks, has led to a great extension of the art. One great point in modern pisciculture is the propagation and rearing of young fish in artificial ponds with the view of introducing fish into some locality where they were not previously found. Salmon and trout ova have been sent from Britain, and successfully propagated in Australia and New Zealand. The art has now come into general favour and is widely followed, very many rivers having on their banks breeding and rearing establishments for the purpose of increasing the stock of fish in the streams. In Scotland a very successful effort has been carried out at Stormontfield, near Perth, on the Tay, and there is a still more famous piscicultural establishment belonging to Sir James Gibson Maitland at Howietoun, near Stirling. The Midlands Counties' Fish Culture Establishment at Malvern Wells is the largest in England. From Huningue, near Basel, on the Rhine, millions of ova are annually despatched to England, Germany, Spain, and other countries. The American Fish and Fisheries Commission have successfully introduced into various waters the American whitefish, the Californian trout, the American brook char, &c., and pisciculture on a large scale is practised both in the United States and Canada. The artificial culture of oysters, mussels, lobsters, and other crustacea, is also receiving attention; and altogether the art is every year attaining a greater development, and

promises to become yet an important department of commercial industry.

Piscid'ia, a genus of plants, nat. order Leguminosæ, the species being West Indian trees. The bark of the root of *P. Erythrina* (dogwood tree) is a powerful narcotic, and is used as a substitute for opium, and also for poisoning fish. The timber makes excellent piles for docks and wharfs, being heavy, resinous, and almost imperishable.

Pisci'na, a niche, generally on the south side of the altar in churches, containing or having attached a stone basin or trough, with a channel leading to the ground. It is used to hold the water in which the priest washes his hands, and for rinsing the chalice.

Pisé (pē'sā), material for forming the walls of cottages, agricultural buildings, &c., consisting of stiff clayey materials usually mixed with gravel well rammed into a frame, and when dry forming a good strong wall. These walls are thicker at bottom than at top. They must not be built too rapidly.

Pisek', a town of Bohemia, on the right bank of the Wottawa, 52 miles south by west of Prague. It is surrounded by an old and lofty wall, flanked with numerous towers; is well built, and contains the remains of a royal castle. Pop. 10,596.

Pisid'ia, in ancient geography, a province of Asia Minor, situated between Phrygia, Cilicia, Pamphylia, Lycia, and Caria. The inhabitants were mountaineers, and were never really subdued by the Romans, being protected by the mountains and ravines which intersect the country.

Pisis'tratus (Greek, *Peisistratos*), 'tyrant' of Athens, was descended from Codrus, the last king of Athens, and was born not later than 612 B.C. He was rich, handsome, and eloquent, and being by nature ambitious he soon placed himself at the head of one of the three parties into which Attica was then divided. By putting himself forward as the patron and benefactor of the poor, and by advocating civil equality and a democratic constitution, he was able (notwithstanding the opposition of Solon) to seize upon the acropolis (citadel) in 560 B.C., and thus to make himself master, or, as the Greeks termed it, 'tyrant' of the city. But though a tyrant in the Greek sense, his use of power was by no means tyrannical. He made no attempt to abolish the wise laws of Solon, but confirmed and extended their authority. He was, however, twice driven from Athens; but in the eleventh year of his second banishment succeeded in making himself master of the sovereignty for the third time. Pisistratus erected splendid public buildings at Athens, established a public library, and collected and arranged the poems of Homer, and conducted himself with so much prudence and clemency that his country scarcely ever enjoyed a longer term of peace and prosperity. He died 527 B.C., leaving two sons, Hippias and Hipparchus, to inherit his power, who were not, however, able to preserve it. See *Hippias*.

Pi'solite. See *Peastone*.

Pistachio (pis-tā'shi-o), a tree of several species, of the genus *Pistacia*, natural order

Pistachio (*Pistacia vera*).

Anacardiaceæ, growing to the height of 15 to 20 feet. *P. vera* yields the well-known pistachio-nut, which contains a kernel of a pleasant taste, resembling that of the almond, wholesome and nutritive, yielding a pleasant oil. It is a native of Western Asia, but is much cultivated in the south of Europe. The gum named mastic is obtained from *P. lentiscus*, as well as from *P. atlantica*. See *Mastic*.

Pistil.
a, style; *b*, stigma.

Pistil, in botany, the female or central seed-bearing organ of a phanerogamous flower, consisting of one or more *carpels* or modified leaves. There may be only a single pistil or several in the same flower. It consists essentially of two parts, the *ovary*, containing the ovules or young seeds, and the *stigma*, a cellular secreting body, which is either seated immediately on

the ovary (as in the tulip and poppy), and is then called *sessile*, or is borne on a stalk called a *style* interposed between the ovary and stigma. It is on the stigma that the pollen falls by which fecundation takes place, after which the ovule develops into the seed. See *Placenta, Botany.*

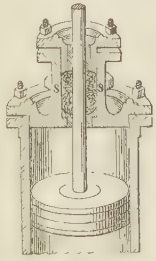
Pistillid'ium, an organ of cryptogamic plants, which seems to have functions analogous to those of the pistil of a phanerogamous flower. It is the young spore-case.

Pistoja (pis-tō'yà; ancient *Pistoria*), a town of Italy, in the province of Florence, and 20 miles north-west of the city of that name, near the left bank of the Ombrone. It is surrounded by lofty walls, contains a Romanesque cathedral (12th–13th century) and other notable churches and buildings, and has manufactures of iron and steel goods, firearms, linen, &c. Pistols were first made here, and received their name from the town. Pop. 20,190.

Pistol, a small firearm with a curved stock, discharged with one hand, named from the town of Pistoja, where they were first made. Pistols were introduced into England in 1521. Mention is made of their use in 1544. The 'dag' mentioned by the Elizabethan writers was a kind of clumsy pistol. Pistols are made of various sizes, ranging from 6 inches (the saloon and pocket pistol) to 18 and even 24 inches (the holster pistol). See *Revolver.*

Pistole (pis-tōl'), a gold coin met with in several parts of Europe, more especially in Spain, value about 16s., but not now coined. It was originally a Spanish coin, and was equivalent to a quarter of a doubloon.

Piston, in machinery, a movable piece, generally of a cylindrical form, so fitted as to occupy the sectional area of a tube, such as the barrel of a pump or the cylinder of a steam-engine, and capable of being driven alternately in two directions by pressure on either of its sides. One of its sides is fitted to a rod, called the *piston-rod*, which it either moves backwards and forwards, as in the steam-engine, where the motion given to the piston-rod is communicated to the machinery, or by which the piston is itself made to move, as in the pump. The piston is usually made to fit tightly by some kind of material used as *packing*, the piston-rod being also made similarly tight by material closely packed in the *stuffing-box* (*s s*).



Piston and Cylinder.

Pit, in horticulture, the name applied to an excavation below the surface of the soil, generally covered by a glazed frame for protecting plants.

Pita Hemp, a name given to the fibre of the agave or American aloe. See *Aloe.*

Pitaval, François Gayot de, a French jurist-consult and miscellaneous writer, born at Lyons in 1673. He was successively abbé, soldier, lawyer, and man of letters. The most important and best known of his works is a collection of criminal trials—Causes Célèbres et Intéressantes (1734–43, twenty vols.).

Pitcairn Island, an island in the South Pacific, belonging to the Low Archipelago, lat. 25° 5′ s.; lon. 130° 5′ w.; length, 2¼ miles; breadth, about 1 mile. It was discovered by Carteret in 1767. Its coast is almost perpendicular throughout its whole extent, fringed with formidable rocks and reefs, accessible only at two points, and not at all in stormy weather. It rises to the height of 1100 feet, and the soil, naturally fertile, yields good pasture, potatoes, yams, plantain and bread-fruit, pine-apples, and other tropical fruits. The island is chiefly remarkable as the home of the descendants of the *Bounty* mutineers, nine of whom, together with six men and twelve women, natives of Tahiti, landed here in 1790. Violent dissensions soon arose, and at the end of ten years the only survivors were John Adams, an Englishman (whose real name was said to have been Alexander Smith), the females, and nineteen children. They were found in 1808 by the American, Captain Folger, who reported the discovery to the British government. The interest thus aroused soon brought other visitors to the island, all of whom dilated with enthusiasm on the virtuous, sober, and industrious life led by the inhabitants. They became, however, too numerous to subsist comfortably on this small island, and they were transferred, to the number of 194, to Norfolk Island in 1856, but about 40 soon returned. In 1881 the inhabitants numbered 96, and in 1884, 130. Whalers and trading vessels occasionally call and exchange the products of civilization for the produce of the island. See *Norfolk Island.*

Pitch, the residuum obtained by boiling tar till the volatile matter is driven off. It

is extensively used for caulking the seams of ships, for preserving wood and iron-work from the effects of water, for making artificial asphalt, &c.

Pitch, the acuteness or gravity of any particular musical sound, which is determined by the number of air-vibrations in a given time—the greater the number the higher the note. In stringed instruments the pitch is dependent on the length, thickness, and degree of tension of the string; in wind instruments, such as the flute or organ, chiefly on the length of the column of air set in motion. (See *Music.*) The tuning-fork is in common use to assist in giving some desired pitch.

Pitch-blende, a mineral chiefly found in Saxony and Cornwall, composed of 86·5 oxide of uranium, 2·5 black oxide of iron, galena, and silex. In colour it varies from brown to black, and occurs globular, reniform, massive, disseminated, and pulverulent. Specific gravity, 7·5. It generally accompanies uranite.

Pitcher-plant, a name given to several plants from their pitcher-shaped leaves, the best known of which is the *Nepenthes distillatoria*, a native of China and the East Indies, and belonging to the natural order Nepenthaceæ. It is a herbaceous perennial, and grows in marshy situations. The leaves are sessile, oblong, and terminated at the extremities by a cylindrical hollow vessel resembling a common water-pitcher, which contains a fluid secreted by the plant itself. This pitcher is furnished with a lid which generally opens in the day and shuts at night, and which is regarded as the true blade of the leaf. Wonderful curative powers are ascribed to the fluid in the pitcher and to the leaf and the root of this plant by the natives of the East Indies and Madagascar.

Pitcher-plant (*Nepenthes distillatoria*).

Pitch-pine. See *Pine.*

Pitch-stone, a black, glossy, pitch-like volcanic rock. It is found chiefly in the Hebrides, Southern Europe, South America, and Mexico, in veins and in dykes or bosses; sometimes forming whole mountains. Specific gravity, 2·29–2·64.

Pitch'urim-beans, the name given to the lobes of the drupe of *Nectandra puchury*, a S. American species of laurel, used by chocolate makers as a substitute for vanilla.

Pith, the cylindrical or angular column of cellular tissue at or near the centre of the stem of a plant, also called the *medulla.* It is not usually continued into the root, but is always directly connected with the terminal bud of the stem.

Pitman, Benn, brother of Sir Isaac Pitman, born July 22, 1822. He lectured on phonography in England from 1843–52. He afterwards settled in Cincinnati, Ohio. He reported the treason trials at Indianapolis, 1865; the trial of Lincoln's assassins, 1865. With Jerome B. Howard he published the Phonographic Dictionary.

Pitman, Sir Isaac, founder of phonography; born at Trowbridge, England, 1813; died 1897. He published a number of works devoted to the science of shorthand.

Piton-bark, same as *Caribbee-bark.*

Pitt, Earl of Chatham. See *Chatham* (*William Pitt, Earl of*).

Pitt, William, second son of the Earl of Chatham, born May 28, 1759; died January 23, 1806. He possessed a remarkable precocious intellect, but his physical powers were weak. He was educated privately till his fourteenth year, when he entered Cambridge. He was called to the bar in 1780, and entered parliament the following year as member for Appleby. His success in the house was of unparalleled rapidity. He supported Burke's financial reform bill, and spoke in favour of parliamentary reform; became chancellor of the exchequer at twenty-three, under the Earl of Shelburne, and in the following year attained the position of prime minister. Although strongly supported by the sovereign, he stood opposed to a large majority of the House of Commons, and a dissolution took place in March 1786. At the general election which followed the voice of the nation appeared decidedly in his favour, and some of the strongest aristocratical interests in the country were defeated, Pitt himself being returned by the University of Cambridge. His first measure was the passing of his India Bill, establishing the board of control, which was followed by much of that fiscal and financial regulation that gave so much *éclat* to the early period of his administration. The establishment of the delusive scheme of a sinking fund followed in 1786, and his Regency Bill in 1788. The French revolution now broke out, and in 1793 war arose be-

tween Great Britain and France, a conflict which brought a heavy responsibility on Pitt, and immense sacrifices and burdens on his country. In 1800 the Irish union was accomplished. In 1801 the opposition of the king to all further concession to the Irish Catholics caused Pitt to resign his post.

William Pitt.—From the statue by Chantrey.

The Peace of Amiens succeeded; and the Addington administration, which concluded it, Pitt supported for a time, and then joined the opposition. The new minister, who had renewed the war, unable to maintain his ground, resigned; and in 1804 Pitt resumed his post at the treasury. Returning to power as a war minister, he exerted all the energy of his character to render the contest successful, and found means to engage the two great military powers of Russia and Austria in a new coalition, which was dissolved by the battle of Austerlitz. This event he did not survive long; his constitution, weakened by hereditary gout, rapidly yielded to the joint attack of disease and anxiety. Biographers naturally differ as to his merits as a statesman; some assign him a most exalted place, while others represent him as entirely destitute of great ideas, as a man of expedients instead of principles, as a lover of place and royal favour. It is, however, universally granted that he was a distinguished orator, even amongst the very eminent speakers of that period, and that he was a man of strict personal honour. A public funeral was decreed to his honour by parliament, and a grant of £40,000 to pay his debts.

Pitta. See *Ant-thrush*.

Pit'tacus, one of the so-called seven wise men of Greece, born about B.C. 652; died 569, at Mitylene, on the island of Lesbos. He was highly celebrated as a warrior, a statesman, a philosopher, and a poet. In 589 the citizens raised him to the dictatorship, an office which he filled for ten years.

Pittsburg, Crawford co., Kans. Pop. 6697.

Pittsburg, a city of the United States, in Allegheny county, Pennsylvania, in the angle between the Monongahela and the Allegheny rivers where they unite to form the Ohio. It is admirably situated for trade, having ample river and railway connection with the great commercial emporiums of the east, west, and south, while in the neighbourhood there are immense and cheaply-obtainable coal supplies. These exceptional advantages have made Pittsburg the chief centre of the American iron and steel industry; smelting furnaces, foundries, rolling-mills, &c., being numerous and on a large scale. The glass manufactures of Pittsburg also rank first in importance in the United States; cotton goods, leather, earthenware, white lead, soda, tobacco, beer and spirits are largely produced; but the chief exports are iron and steel, hardware and machinery, glass, coal, and coke. Pittsburg consists of the town proper and of several large suburbs, and with those that are on the opposite side of the rivers the connection is kept up by twelve bridges, comprising some very excellent examples on the suspension principle. Of the adjacent places, which, though separately incorporated, are properly regarded as only suburbs of Pittsburg, the most important are Allegheny on the right bank of the Allegheny river, a favourite residence with the wealthier classes, and Braddocks on the right bank of the Monongahela to the east of the city. Both Pittsburg and Allegheny possess many fine public buildings and institutions. Natural gas is extensively employed for both lighting and heating purposes. Pittsburg occupies the site of a fort called Du Quesne, built by the French in 1754; captured by the British in 1758, and named after William Pitt. It was chartered in 1816, but since then its boundaries have been several times extended. Pop. in 1890, 238,617 ; Jan. 1899, 290,000.

Pittsfield, a city of the United States, Massachusetts, on the Housatonic, which is here formed by the waters from several lakes. It is well built, manufactures extensively cotton and woollen goods, silk, castings, machinery, tools, paper, boots and shoes, brewery products, &c., and owing to its

salubrious climate and fine scenery is a favourite summer resort. Pop. 17,281.

Pittston, a town of the U. States in Pennsylvania, 9 miles from Wilkesbarre, in an important coal district. Pop. 1890, 10,302.

Pityri'asis, a chronic and non-contagious inflammation of the skin, manifesting itself in red spots or patches on which minute scales are produced, thrown off as soon as formed, and as quickly renewed. It may affect any part, and, though seldom, many parts of the body at the same time; but the commonest is the *P. capitis*, on the head, when the scales are popularly known as scurf or dandriff. Mild forms generally yield to warm bathing and a light diet, if persevered in; but more obstinate cases can only be thoroughly cured by a radical change in the system, produced by suitable regimen and treatment.

Piu'ra, a town of Northern Peru, capital of province of same name, connected by railway with its port, Payta. Pop. 6811.

Pius II. (ÆNEAS SYLVIUS PICCOLOMINI), pope, born 1405, died 1464. He was descended from an illustrious Tuscan family, and studied at the University of Siena. He became secretary to Cardinal Capranica, and the Council of Basel in 1431; to the anti-pope Felix V. in 1439, and to Frederick III. of Germany in 1442. The emperor sent him as imperial ambassador to a diet at Ratisbon, and in 1446 to Pope Eugenius IV. to negotiate the submission of Germany. He gained the favour of Eugenius, whom he had formerly opposed, and by his successor was created bishop of Trieste 1447, and cardinal 1456. He succeeded Calixtus III. as pontiff 1458. In 1460 he published a bull condemning the doctrine he had in former years so vigorously defended: the superiority of a general council to the pope. Pius II. was one of the most learned men of his age, and left some valuable and interesting historical works, orations, and letters.

Pius V. (MICHELE GIUSLIERI), pope, born in 1504, died 1572. He was raised to the cardinalate by Paul IV. in 1557, appointed inquisitor in Lombardy, then inquisitor-general, and chosen pope in 1565. He chiefly distinguished himself by his cruel persecutions of Protestants and Jews; the bull In Cœna Domini was renewed by him, and the authority of the Index Expurgatorius enforced. In 1570 he excommunicated Elizabeth of England. He lent his influence and assistance to Charles IX. of France against his Protestant subjects, and to the Venetians and Spaniards in their war against the Turks. He was canonized by Clement XI.

Pius VI. (GIOVANNI ANGELO BRASCHI), pope, born at Cesena 1717, died at Valence 1799. He held important offices under several pontiffs, was raised to the cardinalate by Clement XIV., and succeeded him in 1775. Several beneficent reforms were introduced by him in the finance department; he also improved the Vatican museum, drained the Pontine Marshes, reconstructed the port of Ancona, and embellished Rome. The French revolution, however, hastened the decay of the temporal power of the holy see. In 1791 Avignon and the county of Venaissin were reunited to France; by the treaty of Tolentino (1797) he lost the Romagna, Bologna, and Ferrara; and on the 15th February 1798, General Berthier established the Roman republic, deprived the pope of his authority, and conveyed him as a prisoner to France, where he died the following year.

Pius VII. (GREGORIO BARNABA CHIARAMONTI), pope, born at Cesena in 1742, died 1823. At the age of sixteen he was received into the order of Benedictines, served as teacher in several abbeys, and subsequently became professor of philosophy in Parma, and of theology in Rome. Pius VI. created him bishop of Tivoli, cardinal and bishop of Imola; and his friendly attitude towards the Cisalpine Republic secured him the favour of France, and the election to the papal chair in 1800. After his accession he aimed at re-establishing the old order of things, and to gain it he tried to conciliate Napoleon by attending his coronation. He aroused the open enmity of the emperor by refusing to be present at the coronation in Milan, and to recognize his brother Joseph as king of Naples; the results being another occupation of Rome by French troops (Feb. 2, 1808), the incorporation of the papal cities, and shortly after of Rome itself, with the kingdom of Italy, and the arrest of the pope (July 6, 1809) and his confinement in Savona and afterwards at Fontainebleau. In 1814 he was released and restored to the possession of all the papal territories except Avignon and Venaissin in France, and a narrow strip of land beyond the Po. His subsequent government was politically and ecclesiastically of a reactionary character.

Pius IX. (GIOVANNI MARIA MASTAÏ-FERRETTI), pope, born in 1792, was destined for a military career, and on the restoration of Pius VII. entered the Guardia Nobile of the Vatican, but soon after adopted the

clerical profession. He held various ecclesiastical offices under Leo XII., who appointed him archbishop of Spoleto in 1827, and to the see of Imola in 1832. Here he acquired much popularity by his liberal tendencies. He further showed his benevolent nature during a mission to Naples at the time of a cholera epidemic, when he sold his plate, furniture, and equipage to relieve the sufferers. Although raised to the cardinalate in 1840, he resided in his diocese until his election to the pontificate in 1846. His accession was signalized by the release of 2000 political prisoners, followed by a complete amnesty; and Italy was to be free and independent under a liberal constitution. But the Italians, who wanted to be free of the Austrians, flocked under the banner of Charles Albert, and Pio Nono, as pontiff, found himself obliged to interfere. Disaster, bloodshed, and anarchy followed, and he had himself to seek safety in flight. A Roman republic was proclaimed (Feb. 1849), with Mazzini at its head. Louis Napoleon, president of the French republic, sent an expedition to Rome, which defeated the Italian patriots under Garibaldi, and occupied the city (July 3). The pope returned in April 1850, but he left the direction of state affairs principally in the hands of his secretary of state, Cardinal Antonelli. On the death of that distinguished prelate, Pio Nono again bestowed his whole attention to the church. He recalled the Jesuits, canonized saints, countenanced miracles, and defined new dogmas. The immaculate conception of the Virgin was settled by a papal decree in 1854, and the dogma of papal infallibility was established by the ecumenical council of 1870. By this time the pope's dominions had been greatly reduced, and what remained of the temporal power was secured by the presence of French troops at Rome. But the downfall of Napoleon III. caused their withdrawal; the Italian troops took possession, and the political rule of the holy see was at an end. The Vatican was left to the pope, and his independence ensured. Free diplomatic intercourse, the honours due to a sovereign, and a civil list of £129,000 yearly, were secured to him. But these he declined, and year after year he confined himself to the Vatican and its garden, declaring that he was under restraint, and a prisoner in his own palace. His death took place in February 1878.

Pizar'ro, Francisco, Spanish adventurer, the discoverer and conqueror of Peru, was born in 1471, the illegitimate son of a hidalgo, and was first a swineherd and then a soldier. The spirit of adventure which at that time pervaded Spain, prompted him to seek fortune in the newly-found continent of America, where he participated in various military and trading expeditions. While resident near Panamá he became associated with two other adventurers, Hernando Lugue, or de Lugues, and Diego de Almagro. In 1524 they jointly fitted out an expedition with a view to exploration and conquest, and on their second voyage discovered Peru; but finding their force inadequate for conquering the country, Pizarro returned to Spain for assistance. He arrived in Seville in 1528, was granted the necessary powers and a small force, and re-crossed the Atlantic in 1531. The following year he arrived in Peru during a civil war, treacherously seized the person of the reigning inca at a friendly banquet, and after extorting an immense ransom, put him to death. The whole empire was gradually conquered without much opposition, but its settlement was long in abeyance owing to a feud between Pizarro and Almagro. Hernando Pizarro, a brother of the general, strangled Almagro in 1537. This act was avenged in 1541 when a son of Almagro murdered Francisco Pizarro in his palace at Lima. Lima was founded by Pizarro in 1535, and his remains are interred in the cathedral of that city, also founded by him.

Pizarro, Gonzalo, half-brother of the preceding, was born in 1502. His brother appointed him governor of Quito in 1540, and after the assassination of Francisco, he raised an army against the new viceroy, Blasco Nuñez, and the latter was defeated and slain near Quito in 1546. But Pizarro did not long enjoy his success, being beaten, taken prisoner, and beheaded in 1548.

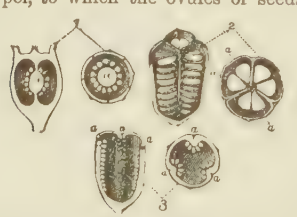
Pizzica'to (Italian), an expression frequently met with in music for instruments of the violin kind, signifying that the notes over which it is placed are not to be played by the bow, but by twitching the strings with the fingers.

Place, La. See *Laplace.*

Placen'ta, the structure which, in the higher Mammalia, connects the fœtus, or unborn embryo, with the circulation of the mother, thus providing for its due nutrition. In its most typical form it is only met with in the higher Mammalia, which are therefore called *placental* mammals, while the

lower Mammalia are termed *implacental* or *aplacental*, from their wanting a placenta; the latter include only the two orders Monotremata and Marsupialia. Certain analogous structures also exist in connection with the development of the young of some species of sharks and dog-fishes. The human placenta presents the most perfect type, and is a special growth on the part both of the womb and the ovum. By the end of pregnancy it forms a disc-like mass, measuring $7\frac{1}{2}$ inches across, $\frac{3}{4}$ inch thick, and about 20 oz. in weight. Connected with it near the middle is the umbilical cord, by means of which the growing embryo is attached to the placenta. Through the placenta and the umbilical cord the blood of the embryo comes into close communication with the blood of the mother, by means of which its purity and nourishing qualities are maintained, and the requisite supply of material furnished for the embryo's continued life and growth. At the end of pregnancy the placenta is thrown off as the after-birth, after the child itself has been expelled.

Placenta, in botany, a development of cellular tissue at the inner or ventral suture of a carpel, to which the ovules or seeds are



Transverse and Vertical Sections to show Placenta. 1, Central Placenta. 2, Axile central Placenta 3, Parietal Placenta. *a a*, Placentæ

attached either immediately or by umbilical cords, as in the pod of the pea. The placenta is formed on each margin of the carpel, and is therefore essentially double. When the pistil is formed by one carpel the inner margins unite in the axis, and usually form a common placenta. When the pistil is composed of several carpels there are generally separate placentas at each of their margins. The term *parietal placenta* is applied to one not projecting far inwards, or one essentially constituted of the wall of the seed-vessel. The form of placentation forms an important distinction between the various orders of plants.

Placentalia, the placental mammals. See *Placenta*.

Placentia. See *Piacenza*.

Placenti'tis, inflammation of the placenta, a disease which occurs acute or chronic, more frequently the latter. It may result from a blow, fall, fright, sudden and violent emotion, and other serious shocks to the system. The fœtus is injuriously affected, and may be destroyed by it; abortion frequently results, and at almost all stages of pregnancy.

Placoid, a term used to designate a variety of scales covering the bodies of the Elasmobranchiate fishes (sharks, skates, rays, &c.), the *Placoidei* of Agassiz. These structures consist of detached bony grains, tubercles, or plates, of which the latter are not uncommonly armed with spines.

Pla'gal, in music, the name given by Gregory the Great to the four collateral scales which he added to the four authentic scales of Ambrose. (See *Gregorian Tunes.*) The term plagal is now applied to melodies in which the principal notes lie between the fifth of the key and its octave. The plagal cadence consists of the chord of the subdominant followed by that of the tonic. See *Music.*

Plagios'tomi (Gr. *plagios*, oblique, *stoma*, mouth), a sub-order of fishes of the order Elasmobranchii, distinguished by the bodies of the vertebræ being either bony or at any rate containing osseous elements; the skull gristly or cartilaginous; the mouth a transverse slit, situated on the under surface of the head; and the teeth numerous. The Plagiostomi include three groups: the Cestraphori, represented solely by the *Cestracion Phillipi* or Port-Jackson shark; the Selachii (sharks and dog-fishes); and the Batides, represented by the skates, rays, and saw-fishes.

Pla'gium, in the Roman law, is the crime of stealing the slave of another, or of kidnapping a free person in order to make him a slave. By Scotch law the crime of stealing an adult person (*plagii crimen*) was punishable with death, and the same punishment has been applied to the stealing of children.

Plague, a contagious and very fatal febrile disease characterized by entire prostration of strength, stupor, delirium, often nausea and vomiting, and certain local symptoms, as buboes, carbuncles, and livid spots (*petechiæ*). Like all other malignant fevers the plague has its various stages, but most frequently runs its course in three days, although death may ensue a few hours after its appearance. If the patient survive the fifth day, he will, under judicious treatment,

generally recover. It is now almost universally admitted that the plague is a specific disease, and that it is the result of a miasmatic poison. It is also well established that unfavourable climatic influences, such as heat and humidity combined, faulty sanitary conditions, inadequate air, light, water, and food, favour its spread when once introduced. There is no specific remedy against the disease, and a variety of treatment has been adopted on different occasions and by different medical men. The plague appeared in the most ancient times, although historians have used the term indiscriminately for other epidemics. The first recorded visitation of the plague to Europe is that at Athens (430 B.C.), described by Thucydides; Josephus relates that of Jerusalem A.D. 72. Among the most disastrous plagues of antiquity are those of Rome in 262, when 5000 persons are said to have died daily; and of Constantinople in 544. From the latter part of the 6th to the 12th century it ravaged at intervals various parts of Europe, particularly France and Germany. In the 13th century it was brought to modern Europe by the Crusaders, and from 1347 to 1350 it traversed all Europe, and was then called the *black death*. The scourge again claimed its victims in the succeeding centuries, and in 1593 it was brought to England by an army returning from the Continent. Before the true nature of the disease became known it had gained a firm footing in London, and there were 11,503 deaths. London lost by the plague 36,269 lives in 1603; 35,500 in 1625; 13,480 in 1636; and 68,600 in 1665. The plague in Marseilles in 1720 caused the death of over 60,000 in seven months, and in Messina (1743) of 43,000 in three months. In 1771 it nearly swept off the whole population of Moscow. Subsequently it appeared locally in Europe at a number of points. Its last appearance in Europe was in 1878–79, on the banks of the Lower Volga (Astrakhan and neighbourhood). It seems still to exist in Arabia, Persia, and other parts of Asia.

Plaice (*Pleuronectes* or *Platessa*), a genus of so-called 'Flat-fishes.' The common plaice (*Pleuronectes platessa* or *Platessa vulgāris*), a well-known food fish, attains an average length of 12 or 18 inches. The dark or upper side is coloured brown, spotted with red or orange; the body is comparatively smooth; the ventral fins are situated on the throat, and are thus jugular in position; the mouth is of small size, and provided with small teeth. These fishes are all 'ground-fishes,' that is, feed and swim near the bottom of the sea. They are caught chiefly by means of trawl-nets.

Plain, a tract of country of nearly uniform elevation; known also as *steppes*, *savannas*, *prairies*, *pampas*. Elevated plains are called *plateaus* or *table-lands*.

Plainfield, Union co., N. J., 24 m. S. W. of Jersey City. Pop. 1890, 11,267.

Plain-song, the name given to the old ecclesiastical chant in its most simple state, and without harmonic appendages. It consists largely of monotone, and its inflections seldom exceed the range of an octave. Ambrose of Milan and Gregory the Great introduced certain reforms into the church music of their day, regarding which see *Gregorian Tones*.

Plaintiff, in law courts, the person who commences a suit against another in law or equity.

Plan, in architecture, a drawing showing the design of a building, a term chiefly used in reference to horizontal sections showing the disposition of the walls and various floors of the building, and of the doors and windows, &c.; but also applied to elevations and vertical sections. A *geometrical plan* is one wherein the several parts are represented in their true proportions. A *perspective plan* is one, the lines of which follow the rules of perspective, thus reducing the sizes of the more distant parts. The term is also applied to the draught or representation on paper of any projected work, as the *plan* of a city or of a harbour.

Plan of Campaign, a sort of slang name for a system adopted in 1887 by many tenants in Ireland, as a means of forcing rent reductions. Tenants, instead of paying rent to the landlords or their agents, deposited what was by them considered a fair rental into the hands of officials of the National League, who then tendered the reduced amount to the proprietor against a full receipt, paying nothing if the money was not accepted. The plan was proclaimed illegal by government.

Planar'ida, the Planarians, a sub-order of flat, soft-bodied annelids, of the order Turbellaria, mostly oval or elliptical in shape, and not unlike the foot of a gasteropodous mollusc. They are for the most part aquatic in their habits, occurring in fresh water or on the sea-shore, but are found occasionally in moist earth. The male and female organs are united in the

same individual, and the process of reproduction may be either sexual, by means of true ova, or non-sexual, by internal gemmation or transverse fission.

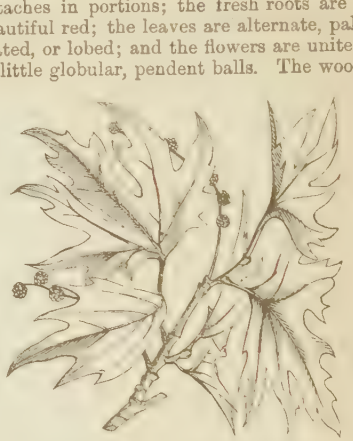
Planché (plang'shā), James Robinson, an English dramatist and miscellaneous writer, was born in 1796, died in 1880. He came forward early as a writer of pieces for the theatre, and also occupied himself with archæology, heraldry, &c., being appointed a pursuivant in the heralds' college, and latterly Somerset herald (1866). He wrote a vast number of extravaganzas, pantomimes, and other light pieces, while among his more serious productions were: History of British Costume; Introduction to Heraldry; The Pursuivant at Arms, a treatise on heraldry; Recollections and Reflections; The Conqueror and his Companions; The Cyclopædia of Costume.

Plane, a joiner's tool, consisting of a smooth-soled solid block, through which passes obliquely a piece of edged steel forming a kind of chisel, used in paring or smoothing boards or wood of any kind. Planes are of various kinds, as the *jack-plane* (about 17 inches long), used for taking off the roughest and most prominent parts of the wood; the *trying-plane*, which is used after the jack-plane; the *smoothing-plane* (7½ inches long) and *block-plane* (12 inches long), chiefly used for cleaning off finished work, and giving the utmost degree of smoothness to the surface of the wood; the *compass-plane*, which has its under surface convex, its use being to form a concave cylindrical surface. There is also a species of plane called a *rebate-plane*, being chiefly used for making rebates. The *plough* is a plane for sinking a channel or groove in a surface, not close to the edge of it. *Moulding-planes* are for forming mouldings, and must vary according to the design. Planes are also used for smoothing metal, and are wrought by machinery. See *Planing Machine*.

Plane, in geometry, a surface such that if any two points in it are joined by a straight line the line will lie wholly within the surface.

Plane, Inclined. See *Inclined Plane*.

Plane-tree (*Platănus*), a genus of trees, natural order Platanaceæ. *P. occidentālis*, the American plane-tree or button-wood (the *sycamore* or *cotton-tree* of the West), abounds in American forests, and on the banks of the Ohio attains sometimes a diameter of from 10 to 14 feet, rising 60 or 70 feet without a branch. The bark is pale-green and smooth, and its epidermis detaches in portions; the fresh roots are a beautiful red; the leaves are alternate, palmated, or lobed; and the flowers are united in little globular, pendent balls. The wood



Oriental Plane-tree (*Platănus orientālis*).

in seasoning takes a dull red colour, is fine-grained, and susceptible of a good polish, but speedily decays on exposure to the weather. The oriental plane (*P. orientālis*), resembles the preceding, and is plentiful in the forests of Western Asia. The *P. orientālis* and *P. acerifolia*, from being able to withstand the deleterious influences of a smoky atmosphere, are among the trees most suitable for planting in towns. The *Acer Pseudo-platănus*, the common sycamore or greater maple, is called in Scotland the plane-tree.

Planet, a celestial body which revolves about the sun as its centre (*primary planets*), or a body revolving about another planet as its centre (*secondary planets*, *satellites*, or *moons*). The known *major* planets are, in the order of their proximity to the sun, Mercury, Venus, the Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. Mercury, Venus, Mars, Jupiter, and Saturn were known to the ancients. Uranus was accidentally discovered by Herschel in 1781, while the discovery of Neptune was the result of pure intellectual work, the calculating of Leverrier and Adams (1845). The planetoids or asteroids are small bodies discovered since the beginning of the present century between the orbits of Mars and Jupiter. The number of these asteroids is annually increased by fresh discoveries; nearly 290 are now known. Mercury, Venus, the Earth, and Mars closely resemble

each other in many respects. They are all of moderate size, with great densities; the earth weighing as much as five and a half times an equal bulk of water. They shine only by reflected sunlight. Jupiter, Saturn, Uranus, and Neptune, on the other hand, are of enormous size, of small densities, some of them weighing less than an equal bulk of water, and probably exist at a high temperature, and give out in addition to reflected sunlight a considerable amount of light and heat of their own. The most colossal of the planets is Jupiter; its volume exceeds that of the earth about 1200 times. Saturn is next in size. Mars, Jupiter, Saturn, Uranus, and Neptune, being outside the earth's orbit, are sometimes called the *superior planets;* Venus and Mercury, being within the earth's orbit, are called *inferior planets.* The family of major planets has also been subdivided into *intra-asteroidal* planets—Mercury, Venus, the Earth, Mars; and *extra-asteroidal* planets—Jupiter, Saturn, Uranus, and Neptune, the character of the two being very different as above described. The planet which approaches nearest to the earth is Venus, the least distance in round numbers being 23 millions of miles; the most distant is Neptune, least distance 2629 million miles. We give here a comparative table of the planets; see also the separate articles.

	Mean Distance from the Sun.	Distance from the Earth.		Time of Revolution round the Sun.	Time of Rotation on Axis.		
		Greatest.	Least.				
	Miles.	Miles.	Miles.	Mean Solar Days.	h.	m.	s.
Mercury.....	35,393,000	135,631,000	47,229,000	87·9692	24	5	28
Venus.....	66,131,000	159,551,000	23,309,000	224·7007	23	16	19
The Earth.....	91,430,000	....	....	365·2563	23	56	4
Mars.....	139,312,000	245,249,000	62,389,000	686·9794	24	37	23
Jupiter.....	475,693,000	591,569,000	408,709,000	4332·5848	9	55	28
Saturn	872,135,000	1,014,071,000	831,210,000	10759 2197	10	29	17
Uranus.....	1,753,851,000	1,928,666,000	1,745,806,000	30686·8205		?	
Neptune	2,746,271,000	2,863,183,000	2,629,360,000	60126·722		?	

Planeta'rium. See *Orrery.*

Planim'eter, an instrument by means of which the area of a plane figure may be measured. It is employed by surveyors in finding areas on maps, &c.

Planing Machine, a machine tool for planing wood or metal. For the former purpose the usual form has cutters on a drum rotating on a horizontal axis over the board which is made to travel underneath. The cutter-drum may be repeated underneath and at the edges, so as to plane all sides simultaneously. In planing metals the object to be planed, fixed on a traversing table, is moved against a relatively fixed cutter, which has a narrow point and removes only a fine strip at each cut.

Plant. See *Botany.*

Plantagenet, a surname first adopted by Geoffrey, Count of Anjou, and said to have originated from his wearing a branch of broom (*plante de genêt*) in his cap. This name was borne by the fourteen kings, from Henry II. to Richard III., who occupied the English throne from 1154–1485. In 1400 the family was divided into the branches of Lancaster (Red Rose), and York (White Rose), and from their reunion in 1485 sprang the House of Tudor. See *England.*

Plantagin'eæ, or PLANTAGINA'CEÆ, the plantains, a small nat. order of plants belonging to the monopetalous exogenous series. It consists of herbaceous, rarely suffrutescent, plants, with alternate or radical, rarely opposite, leaves, and inconspicuous flowers on scapes arising from the lower leaves. The rib-grass or rib-wort (*Plantāgo lanceolāta*), the root and leaves of which were formerly used in medicine as astringents, is a common type found all over Europe. See also next article.

Plantain (*Plantāgo major*), or GREAT PLANTAIN, a common weed, the leaves of which are all radical, oval, and petiolate, and from amongst them arise several long cylindrical spikes of greenish inconspicuous flowers. The root and seed are still occasionally employed in the treatment of diarrhœa, dysentery, and external sores; the seeds are also collected for the food of birds. —The name is also given to an entirely different plant. See next article.

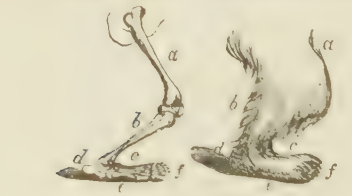
Plantain, PLANTAIN-TREE, the type of the natural order Musaceæ. *Musa paradisiāca,*

a native of the East Indies, is cultivated in mostly all tropical countries. The stem is soft, herbaceous, 15 to 20 feet high, with leaves often more than 6 feet long and nearly 2 broad. The fruit grows in clusters, is about 1 inch in diameter and 8 or 9 inches long. The stem dies down after fruiting; but the root-stock is perennial, and sends up numerous fresh shoots annually. It is easily propagated by suckers. The banana (which see) is a closely-allied variety or species. Their fruits are among the most useful in the vegetable kingdom, and form the entire sustenance of many of the inhabitants of tropical climates. A dwarf variety, *M. chinensis*, produces a fruit in European hothouses. The fibres of the leaf-stalks of *M. textilis* of the Philippine Islands supplies Manilla hemp or abaca, from which cordage of the strongest character is made, the finer fibres being used in making cloth.

Plantain-eaters, a group of perching birds, family Musophagidæ. The genus *Musophăga* of tropical Africa includes the most typical forms. These birds chiefly feed upon the fruit of the banana and plantain-tree. The base of the bill appears as a broad plate covering the forehead. The plumage exhibits brilliant coloration. The members of the genus *Corythaix* or *Touracos* possess a bill of ordinary size and conformation, and feed on insects in addition to fruits.

Plantation, a term formerly used to designate a colony. The term was latterly applied to an estate or tract of land in the Southern States of America, the West Indies, &c., cultivated chiefly by negroes or other non-European labourers. In the Southern States the term *planter* is specially applied to one who grows cotton, sugar, rice, or tobacco.

Plantigra'da, PLANTIGRADES, carnivorous animals in which the whole or nearly the whole sole of the foot is applied to the ground in walking. This section includes the bears, raccoons, coatis, and badgers. Carnivora which, like the weasels and civets, use only part of the sole in walking, are termed *semi-plantigrada*.



Plantigrada—Foot of Polar Bear

a, Femur or thigh. *b*, Tibia or leg. *c*, Tarsus or foot *d*, Calx or heel. *e*, Planta or sole of foot. *f*, Digiti or toes.

Plant-lice. See *Aphis*.

Plasen'cia, a walled town in Spain, Estremadura, almost surrounded by the river Yerte, 120 miles W.S.W. of Madrid. Its cathedral, episcopal palace, and ruined towers are the chief objects of interest. Pop. 7090.

Plasma, a siliceous mineral of a green colour, which, especially in ancient times, was used for ornamental purposes.

Plassey, a village in Bengal, on the Hooghly, 80 miles north of Calcutta. Here on June 23, 1757, Colonel, afterwards Lord Clive, with 900 Europeans and 2100 sepoys, defeated Suraja Dowla with an army consisting of 50,000 foot and 18,000 horse, and laid the foundation of the British Empire in India.

Plastering is the art of covering the surface of masonry or wood work with a plastic material in order to give it a smooth and uniform surface, and generally in interiors to fit it for painting or decoration. In plastering the interior of houses a first coat is generally laid on of lime, thoroughly slacked, so as to be free from any tendency to contract moisture, and mixed with sand and cow's hair. For the purpose of receiving this coat the wall is generally first covered with laths or thin strips of wood, with narrow interstices between. The face of the first coat, which should be of considerable thickness, is trowelled, or indented with cross lines by the trowel, to form a key for the finishing coats. The second coat is applied to this when it is thoroughly dried. It is rubbed in with a flat board so as thoroughly to fill the indentations and cover the unequal surface of the first coat with a smooth and even one. In plastering walls great care must be taken to have the surface perfectly vertical. The setting coat, which is of pure lime, or for mouldings or finer work of plaster of Paris or stucco, is applied to the second coat before it is quite dry. A thin coating of plaster of Paris is frequently applied to ceilings after the setting coat.

Plaster of Paris, the name given to gypsum (which see) when ground and used for taking casts, &c. If one part of powdered gypsum be mixed with two and a half parts of water a thin pulp is formed, which after a time sets to a hard, compact mass.

By adding a small quantity of lime to the moistened gypsum a very hard marble-like substance is obtained on setting.

Plasters are applications of local remedies to any part of the surface of the body by means of a supporting texture of leather, silk or other cloth, or merely of paper. Plasters may be intended to give protection, support, or warmth, or they may be actively medicinal. (See *Blisters.*) The materials most frequently used in plasters are belladonna, cantharides, galbanum, isinglass, lead, mercury, opium, pitch, resin, iron, and soap, and their adhesive property is generally due to the combination of oxide of lead with fatty acids.

Plastic Clay, in geology, a name given to one of the beds of the Eocene period from its being used in the manufacture of pottery. It is a marine deposit.

Plata, La, United Provinces of. See *Argentine Republic.*

Plata, Rio de la (*River of Silver*), or River Plate, runs for more than 200 miles between the Argentine Republic and Uruguay, and is not, strictly speaking, a river, but rather an estuary, formed by the junction of the great rivers Paraná and Uruguay (which see). It flows into the Atlantic between Cape St. Antonio and Cape St. Mary, and has here a width of 170 miles. On its banks are the cities and ports of Montevideo and Buenos Ayres. Navigation is hampered in some parts of the river by shallow water and sand-banks. It was discovered in 1515 by Juan Diaz de Solis, and called Rio de Solis; it owes its present name to the famous navigator Cabot.

Platæ'a, a city of ancient Greece, in Bœotia, now wholly in ruins. It has a permanent place in history on account of the great battle which was fought in its vicinity in September, 479 B.C., when 100,000 Greeks under Pausanias defeated about thrice that number of Persians under Mardonius.

Plata'lea. See *Spoonbill.*

Platanis'ta, a fresh-water dolphin, differing chiefly from the true Delphinidæ in its blow-hole being a longitudinal instead of transverse fissure. It is represented by a single species (*P. gangetica*), which inhabits the estuary of the Ganges. An allied form (*Inia Boliviensis*) inhabits the rivers of Bolivia.

Plat'anus, the plane-tree genus, type of the order Platanaceæ, which consists of this one genus. See *Plane-tree.*

Plate. See *Plate-marks.*

Plateau (pla-tō'). See *Table-land.*

Plate-glass. See *Glass.*

Plate-marks, in Britain, a series of marks: hall-mark, sovereign's-mark, name mark (first letter of Christian and surname of maker), and date mark (a variable letter), legally stamped upon gold and silver plate as an index to quality, name of maker, date and place of manufacture. The duty of assaying and stamping gold and silver-wares is performed by the Goldsmiths' Company of London. Their marks are a leopard's head crowned, and a lion passant as the sovereign's mark. Affiliated with Goldsmiths' Hall are the following assay-offices, each of them having a distinctive mark: Birmingham, an anchor; Chester, three garbs (or sheaves) and a dagger; Exeter, a castle with three towers; Newcastle, three castles; Sheffield, a crown; Edinburgh, a thistle; Glasgow, tree, fish, and bell; Dublin, a harp, crowned. Plate, whether of home or foreign make (the latter bears in addition to the usual marks the letter F in an oval escutcheon), must be of one of the standards prescribed by law, and hall-marked, before it can be dealt in, or even exposed for sale. Forfeiture and a fine of £10 for each article are the penalties attached to breaches of this law. The standards are: gold, 22, 18, 15, 12, and 9 carats (24 carats = pure gold); silver, almost invariably 11 ozs. 2 dwts. per lb. troy. Foreign plate of an ornamental character manufactured before 1800, jewelry with stone settings or so richly chased that it could not be stamped without injury, silver chains, necklets, and lockets, and a variety of small fancy articles, are exempt from hall-marking. Gold plate is liable to a duty of 17*s.* per oz., silver plate 1*s.* 6*d.* per oz.; this duty is payable at the assay-offices before the assayed and stamped goods are returned. A rebate of $\frac{1}{4}$th in gross weight is allowed if articles are sent in an unfinished state. All *plain* rings, of whatever weight, are considered as *wedding* rings, and liable to duty, while rings chased or jewelled are free. For dealing in plate of gold above 2 dwts. and under 2 ozs. in weight, or of silver above 5 dwts. and under 30 ozs. per article, a plate license of £2, 6*s.* (renewable annually) is required; for heavier wares the amount of annual license is £5, 15*s.*

Plate-powder, a fine powder for cleaning gold and silver plate, commonly made of a mixture of rouge and prepared chalk.

Plating, the coating of a metallic article with a thin film of some other metal, espe-

cially gold or silver. As regards plating with precious metals, electro-deposition has entirely superseded the old Sheffield method, which consisted in welding plates of various metals at high temperatures. This welding process is now, however, largely employed in plating iron with nickel for cooking vessels, iron with brass for stair-rods and other furnishing and domestic requisites, and lead with tin for pipes, &c. See *Electro-plating*.

Plat'inum, one of the metals first made known to Europe in 1741. *Native platinum* occurs mostly in small irregular grains, generally contains a little iron, and is accompanied besides by iridium, osmium, rhodium, palladium, ruthenium (hence called the 'platinum metals'), and also sometimes by copper, chromium, and titanium. It was first obtained in Peru, and has since been found in various other localities, such as Canada, Oregon, the West Indies, Brazil, Colombia, Borneo, &c., but the chief supply of platinum ore comes from the Ural Mountains in Siberia. It was there discovered in beds of auriferous sands in 1823, and has been worked by the Russian government since 1828. Pure platinum is almost as white as silver, takes a brilliant polish, and is highly ductile and malleable. It is the heaviest of the ordinary metals, and the least expansive when heated; specific gravity 21·53 rolled, 21·15 cast. It undergoes no change from the combined agency of air and moisture, and it may be exposed to the strongest heat of a smith's forge without suffering either oxidation or fusion. Platinum is not attacked by any of the pure acids. Its only solvents are chlorine and nitro-muriatic acid, which act upon it with greater difficulty than on gold. In a finely divided state it has the power of absorbing and condensing large quantities of gases. On account of its great infusibility, and its power generally of withstanding the action of chemical reagents, platinum is much used as a material for making vessels to be used in the chemical laboratory. Crucibles, evaporating dishes, &c., are very often made of platinum; so also the large stills used for the evaporation of sulphuric acid. The useful alloys of platinum are not numerous. With silver it forms a tolerably fusible white alloy, malleable and brilliant when polished; but it scales and blackens by working. Gold, by a forge heat, combines with platinum, and the alloys, in all proportions, are more fusible than the latter metal. In the proportion of 38 grs. to 1 oz. it forms a yellowish-white, ductile, hard alloy, which is so elastic after hammering that it has been used for watch-springs; but the favourable results expected from them have not been realized. Alloyed with iridium (a rare metal of the same group) it possesses an excellent and unalterable surface for fine engraving, as in the scales of astronomical instruments, &c. This alloy has also been adopted for the construction of international standards of length and weight. Mercury, by trituration with spongy platinum, forms an amalgam at first soft, but which soon becomes firm, and has been much used in obtaining malleable platinum. A coating of platinum can be given to copper and other metals by applying to them an amalgam of spongy platinum and 5 parts of mercury; the latter metal is then volatilized by heat. Lead combines with platinum readily; and iron and copper in like manner. The last-mentioned, when added in the proportion of 7 to 16 of platinum and 1 of zinc, and fused in a crucible under charcoal powder, forms the alloy called artificial gold. Steel unites with platinum in all proportions, and, especially in the proportion of from 1 to 3 per cent of platinum, forms a tough and tenacious alloy, well adapted for cutting instruments. Arsenic unites easily with platinum, and is sometimes employed for rendering the latter metal fusible. An alloy of platinum, iridium, and rhodium is used for making crucibles, &c. It is harder than pure platinum, is less easily attacked by chemical reagents, and bears a higher temperature without fusing.

Plato, an ancient Greek philosopher, founder of one of the great schools of Greek philosophy, was born at Athens in B.C. 429, died in B.C. 347. Few particulars of his life are known, but it is beyond doubt that he was well connected and carefully educated. About his twentieth year he came directly under the influence of Socrates, and from this time he gave himself entirely to philosophy. Until the death of Socrates (B.C. 399) he appears to have been his constant and favourite pupil; but after that event Plato is supposed to have left Athens with a view to improving his mind by travel. He is said to have visited Cyrene (in North Africa), Lower Italy, and Sicily. Various other journeys are attributed to him, but without sufficient authority. About B.C. 389 or 388 Plato returned to Athens and began to teach his philosophical system in a gymnasium known as the Academy, his subsequent life being unbroken, except by two

visits to Sicily. He appears to have had a patrimony sufficient for his wants, and taught without remuneration. One of his pupils was Aristotle.

The reputed works of Plato consist of Dialogues and Letters, the latter now regarded as spurious; but the genuineness of most of the Dialogues is generally admitted. The chronology of the Dialogues is a matter of uncertainty. The first attempt at a critical arrangement was made by Schleiermacher, who adopted an arrangement into three divisions, according to the leading doctrines he believed they were intended to inculcate. The chief works in the first section are Phædrus, Protagoras, Parmenides, Lysis, Laches, Charmides, Euthyphron; in the second, Theætetus, Sophistes, Politicus, Phædo, Philebus, Gorgias, Meno, Euthydemus, Cratylus, Symposium; in the third, the Republic, Timæus, Critias, and the Leges or Laws. Hermann has attempted to make out a chronological arrangement, and other scholars who differ from Schleiermacher have attempted various theories of constructive arrangement. These schemes in general proceed on the assumption that each dialogue, being an artistic whole, forms a link in a chain. Grote and others, however, do not admit that Plato followed any plan either artistic or didactic. Apart from their philosophical teaching the dialogues of Plato are admirable as works of literature, especially for their dramatic truthfulness, and exhibit Greek prose in its highest perfection. In all of them Socrates (idealized) appears as one of the speakers. They contain also lively and accurate accounts of previous systems of Greek philosophy and their teachers, introduced not merely for historical purposes, but incidentally to the analysis of their opinions. There is an excellent English translation of the whole by Jowett.

Plato.—Antique gem.

The philosophy of Plato must be regarded as one of the grandest efforts ever made by the human mind to compass the problem of life. After the example of Socrates he held the great end of philosophic teaching to be to lead the mind of the inquirer to the discovery of truth rather than to impart it dogmatically, and for this end he held oral teaching to be superior to writing. This preference appears to have determined the conversational form given to most of his works. Plato originated the distinction of philosophy into the three branches of ethics, physics, and dialectics, although these names were first applied by his disciple Xenocrates. The cardinal principle of Plato's dialectical system is the doctrine of ideas. True science, according to him, was conversant, not about those material forms and imperfect intelligences which we meet with in our daily intercourse with men; but it investigated the nature of those purer and more perfect patterns which were the models after which all created beings were formed. These pefect types he supposes to have existed from all eternity, and he calls them the *ideas* of the great original Intelligence. As these cannot be perceived by the human senses, whatever knowledge we derive from that source is unsatisfactory and uncertain. Plato, therefore, maintains that degree of scepticism which denies all permanent authority to the evidence of sense. Having discovered or created the realm of ideas he surveyed it throughout. He defined its most excellent forms as beauty, justice, and virtue, and having done so he determined what was the supreme and dominant principle of the whole. It is the idea of the Good. The harmony of intelligence throughout its entire extent with goodness, this is the highest attainment of Plato's philosophy. His ethical system was in direct dependence upon his dialectics. He believed that the ideas of all existing things were originally contained in God. These ideas were each the perfection of its kind, and as such were viewed by God with approval and love. God himself being infinitely good was the object of all imitation to intelligent beings, hence the ethics of Plato had a double foundation, the imitation of God and the realization of ideas, which were in each particular the models of perfection. To his cosmical theories he attributed only probability, holding that the dialectical method by which alone truth could be discovered was applicable only to ideas and the discovery of moral principles. The most valuable part of Plato's cosmogony is its first principle, that God, who is without envy, planned all things that they should be as nearly as possible like himself.

Plato's political treatises are the application of his ethical principles to social organization. His genius was more adapted to build imaginary republics than to organize real ones; hence his judgment of statesmen is also faulty and often unjust, as, for instance, in the case of Pericles and Themistocles. He was guided by one grand principle, which is mentioned in several of his writings, that the object of the education and instruction of young people, as well as of the government of nations, is to make them better; and whoever loses sight of this object, whatever merit he may otherwise possess, is not really worthy of the esteem and approbation of the public.

The followers of Plato have been divided into the Old, Middle, and New Academies; or into five schools; the first representing the Old, the second and third the Middle, and the fourth and fifth the New Academy. In the first are Speusippus, Xenocrates, and Heraclides, and others. Of these the first reverted to pantheistic principles, the second to mysticism, and the last was chiefly distinguished as an astronomer. In the Middle Academy, of which were Arcesilas and Carneades, the founders of the second and third school, sceptical tendencies began to prevail. The New Academy began with Philo of Larissa, founder of the fourth school.

Platoff', hetman of the Cossacks and a distinguished Russian cavalry officer, born about 1763–65, died 1818. He successfully fought the Turks in Moldavia, and largely contributed to the great disaster which befel the French army retreating from Moscow in 1812.

Platonic Love, a term by which is generally understood a pure spiritual affection between the sexes unmixed with carnal desires, and regarding the mind only and its excellences.

Platoon', in military language, meant formerly a small body of men in a battalion of foot, &c., that fired alternately. The term is now applied to two files forming a subdivision of a company; hence also *platoon-firing*, firing by subdivisions.

Plattdeutsch (plät'doich), or LOW GERMAN, is the language of the North German Lowlands, from the borders of Holland to those of Russian Poland. The Dutch and Flemish languages also belong to the Low German dialects, but being associated with an independent political system, and having a literature of their own, are reckoned as distinct languages. The Low German dialects agree in their consonantal system not only with Dutch and Flemish, but also with English and the Scandinavian tongues. (See *Philology*.) Until the Reformation Low German was the general written language of the part of the Continent above mentioned; but from that time Low German works became gradually fewer, owing to the position now taken by the High (or modern classical) German. Even as a spoken language High German has ever since been slowly superseding the Low. In recent times, however, Low German literature has received a new impetus from Klaus Groth and Fritz Reuter. Linguistically the Low German dialects have received a good deal of attention, and many valuable lexicographical works have appeared.

Platte (plat), a river in the United States, which rises in the Rocky Mountains by two branches, called respectively the North and South Forks of the Platte. The united stream falls into the Missouri after a course of about 1600 miles. It is from 1 mile to 3 miles broad, shallow, encumbered with islands, has a rapid current, and therefore not navigable.

Plattensee (plat'ĕn-zā). See *Balaton*.

Plattner, CARL FRIEDRICH, German metallurgist, born 1800, died 1858. From 1842–57 he held the professorship of metallurgy at Freiberg, and taught and experimented with great success. He is best known for his application of the blow-pipe to the quantitative assay of metals.

Plattsburg, a manufacturing town and military station of the United States, in the state of New York, on the Saranac, where it enters Lake Champlain. Pop. 7010.

Plattsmouth, Cass co., Nebraska, 22 m. S. of Omaha, has foundries and various factories. Pop. 1890, 8392.

Platyelmia ('Flat-worms'), a division of the class Scolecida. They are represented by the tape-worm, 'flukes,' &c.

Plat'ypus. See *Ornithorhynchus*.

Platyrhi'na. See *Monkeys*.

Plauen, a thriving manufacturing town in Saxony, circle of Zwickau, in a beautiful valley on the left bank of the Elster, 60 miles S. of Leipzig, 78 miles W.S.W. of Dresden. It is walled and has a castle. Manufactures machinery, paper, leather, calicoes, and extensively all kinds of embroidered goods. Pop. 1890, 47,077.

Plautus, TITUS MACCIUS, one of the oldest and best Roman comic writers, and one of the founders of Roman literature, born at

Sarsina, in Umbria, about B.C. 254; died B.C. 184. We have few particulars of his life. He is said to have been first connected with a dramatic company at Rome; then to have engaged in business, but losing his means was at one time in a very destitute condition, and compelled to earn his livelihood by turning a baker's hand-mill, in which position he became a successful writer of comedies. The purity of his language, his genuine humour, and his faithful portrayal of middle and lower class Roman life, made him a great favourite with the Roman public, and his plays successfully held the stage for some centuries. He was much admired by Cicero and Varro. For his characters, plots, scenes, &c., he was chiefly indebted to the poets of the new Attic comedy, but the language was his own. Some twenty of his plays have been preserved to us, a few of them more or less mutilated.

Playfair, JOHN, Scottish natural philosopher and mathematician, born in Forfarshire 1748, died at Edinburgh 1819. He entered the University of St. Andrews at fourteen, where he soon displayed special talent for mathematics and natural philosophy. Having entered the church he held a living for some years. In 1785 he was chosen assistant-professor of mathematics in the University of Edinburgh. In 1802 appeared his Illustrations of the Huttonian Theory of the Earth, and in the following year a Biographical Account of Dr. James Hutton. In 1805 he obtained the chair of natural philosophy in Edinburgh University. The Royal Society of London elected him a member in 1807. He paid a visit to the Continent in 1815, and spent some seventeen months in France, Switzerland, and Italy. He published Elements of Euclid and Outlines of Natural Philosophy, and contributed many valuable papers to the Transactions of the Royal Societies of Edinburgh and London, and to the Edinburgh Review. His writings are models of composition and argument.

Playfair, SIR LYON, a British scientist and politician, son of Dr. G. Playfair, inspector-general of hospitals in Bengal, was born at Meerut, Bengal, in 1819, and educated at St. Andrews and Edinburgh Universities. He studied chemistry under Graham in Glasgow and London, and under Liebig at Giessen. His able reports on the sanitary condition of the large towns of Britain, and his valuable services as special commissioner at the London Exhibition of 1851, first brought him prominently before the public. He became connected with the science and art department at its establishment in 1853, inspector-general of government museums and schools of science in 1856, and was professor of chemistry at Edinburgh University 1858–69. From 1868–85 he represented Edinburgh and St. Andrews Universities in the House of Commons, and since then the southern division of Leeds. He has held several appointments under Liberal governments, including that of postmaster-general 1873 74, and was created a K.C.B. in 1883. Besides his scientific memoirs he has published numerous important papers on political, social, and educational subjects. Most of these economical essays have recently been collected and published under the title Subjects of Social Welfare. He was also an LL. D. of Edinburgh (1869), F. R. S. Was a member of many learned societies, etc. Died May 29, 1898.

Playing-cards. See *Card.*

Plebeians (ple-bē'anz), or PLEBS, in ancient Rome, one of the great orders of the Roman people, at first excluded from nearly all the rights of citizenship. The whole government of the state, with the enjoyment of all its offices, belonged exclusively to the Patricians, with whom the Plebeians could not even intermarry. The civil history of Rome is to a great extent composed of the struggles of the Plebeians to assert their claim to the place in the commonwealth to which their numbers and social importance entitled them, and which were crowned with complete success when (B.C. 286) the Lex Hortensia gave the *plebiscita,* or enactments passed at the plebeian assemblies, the force of law. From this time the privileges of the two classes may be said to have been equal.

Pleb'iscite, a vote of a whole nation obtained by universal suffrage, a form of voting introduced into France under the Napoleonic régime, and named after the Roman *plebiscita.* (See above article.) The term is also used in a more general sense.

Plectog'nathi, a sub-order of Teleostean fishes, distinguished by the maxillary and intermaxillary bones on each side of the jaw being firmly united together by bony union. The head is large, and the union of its bones firmer than in any other Teleostean fishes; the body generally short, skin horny, fins small and soft. As examples of the chief fishes included in this group we may cite the trunk-fishes, the file-fishes, the globe-fishes, the sun-fishes, &c.

Pledge, or Pawn, in law, is a species of bailment, being the deposit or placing of goods and chattels, or any other valuable thing of a personal nature, as security for the payment of money borrowed, or the fulfilment of an obligation or promise. If the money is not paid at the time stipulated the pawn may be sold by the pawnee, who may retain enough of the proceeds to pay the debt intended to be secured. See *Pawnbroker*.

Pleiades (plī'a-dēz), the so-called 'seven stars' in the neck of the constellation Taurus, of which only six are visible to the naked eye of most persons. They are regarded by Mädler as the central group of the Milky Way. Ancient Greek legends derive their name from the seven daughters of Atlas and the nymph Pleione, fabled to have been placed as stars in the sky, and the loss of the seventh was variously accounted for. In reality the cluster consists of far more than seven stars.

Pleistocene (plīs'to-sēn; Gr. *pleistos*, most, and *kainos*, recent), in geology, the lower division of the Post-tertiary formation. The fossil remains belong almost wholly to existing species. The Pleistocene mollusca all belong to still living species, but its mammals include a few extinct forms. It is also known as the 'glacial' or 'drift' period, owing to the great prevalence of glaciers and icebergs at that period. See *Pliocene*.

Plenipoten'tiary, an ambassador appointed with full power to negotiate a treaty or transact other business. See *Ministers*.

Ple'onasm, in rhetoric, is a figure of speech by which we use more words than seem absolutely necessary to convey our meaning, in order to express a thought with more grace or greater energy; it is sometimes also applied to a needless superabundance of words.

Plesiosau'rus, a genus of extinct amphibious animals, nearly allied to the Ichthyosaurus. The remains of this curious genus were first brought to light in the Lias of Lyme Regis in 1822, but over twenty species are now known, and they have formed the subject of important memoirs by Owen and other palæontologists. Its neck was of enormous length, exceeding that of its body; it possessed a trunk and tail of the proportions of an ordinary quadruped; to these were added the paddles of a whale. The neck vertebræ numbered forty or fewer. From twenty to twenty-five dorsal segments existed; and two sacral vertebræ and from thirty to forty caudal segments completed the spine. No distinct breast-bone was developed. The head was not more than $\frac{1}{12}$th or $\frac{1}{13}$th of the length of the body; the snout of a tapering form; the orbits large and

Plesiosaurus, partially restored.

wide. The teeth were conical, slender, curved inwards, finely striated on the enamelled surface, and hollow throughout the interior. These animals appear to have lived in shallow seas and estuaries, and, in the opinion of some, they swam upon or near the surface, having the neck arched like the swan, and darting it down at the fish within reach. Some of the Plesiosauri were upwards of 20 feet long. Their remains occur from the Lias to the Chalk rocks inclusive, these forms being thus exclusively of the Mesozoic age.

Pleth'ora, in medicine, an excess of blood in the human system. A florid face, rose-coloured skin, swollen blood-vessels, frequent nose-bleeding, drowsiness and heavy feeling in the limbs, and a hard and full pulse, are symptoms of this condition, habitual in many persons, and which, if not actually a disease, yet predisposes to inflammations, congestions, and hæmorrhages. Plethora may, however, develop in persons of all conditions and ages as the result of too much stimulating food (as an excessive meat-diet), overeating, large consumption of malt and spirituous liquors, residence in northern and elevated regions with sharp, dry air, want of exercise, too much sleep, amputation of a limb—in short, of any action tending to unduly increase the volume of blood. Plethora of a mild form may be reduced by copious draughts of diluents, a vegetable diet, and plenty of exercise; but in cases requiring prompt relief leeches or bleeding must be resorted to.

Pleura, the serous membrane lining the cavity of the thorax or chest, and which also covers the lungs. Each lung is invested by a separate pleura or portion of

this membrane. In the thorax each pleura is found to consist of a portion lining the walls of the chest, this fold being named the *parietal layer* of the pleura. The other fold, reflected upon the lung's surface, is named in contradistinction the *visceral layer*. These two folds inclose a space known as the *pleural cavity*, which in health contains serous fluid in just sufficient quantity to lubricate the surfaces of the pleuræ as they glide over one another in the movements of respiration. The disease to which the pleuræ are most subject is *pleurisy* (which see).

Pleu'risy, the inflammation of the pleura. It may be acute or chronic, simple or complicated with catarrh and pneumonia. Generally part only of the pleura is affected, but sometimes the inflammation extends to the whole, and even to both pleuræ (double pleurisy). Acute, it is a very common complaint due to a variety of causes, but most frequently to sudden chills. It invariably commences with shivering, its duration and intensity generally indicating the degree of severity of the attack; fever and its attendant symptoms succeed the shivering. A sharp, lancinating pain, commonly called stitch in the side, is felt in the region affected at each inspiration. A short, dry cough also often attends this disease. While the inflammation continues its progress a sero-albuminous effusion takes place, and when this develops the febrile symptoms subside, usually from the fifth to the ninth day. Acute pleurisy is seldom fatal unless complicated with other diseases of the lungs or surrounding parts, and many patients are restored simply by rest, moderate sweating in bed, spare and light diet, mild and warm drinks, and the application of hot mustard and linseed-meal poultices to the affected part. Opiates to relieve pain are often needful. When acute pleurisy is treated too late or insufficiently it may assume the chronic condition, which may last from six weeks to over a year, and result in death from gradual decay, as in the case of consumptives, or from asphyxia. Chronic pleurisy is characterized by effusion, which accumulates in the pleural cavity, and soon tends to produce lesions and complications in the surrounding organs. Besides local treatment purgatives and diuretics are used, but if the disease does not yield to these remedies, the liquid must be evacuated by operation. Pleurisy, acute and chronic, sometimes also appears without accompanying pain; it is then called *latent* pleurisy.

Pleurisy-root. See *Butterfly-weed.*

Pleuronec'tidæ, the group of fishes included in the section Anacanthini of that order, and represented by the soles, flounders, brill, turbot, halibut, plaice, &c. The scientific name Pleuronectidæ therefore corresponds to the popular designation of 'Flat-fishes' applied to these forms.

Pleuro-pneumonia, a form of pneumonia peculiar to the bovine race. It is highly contagious, and proves rapidly fatal. It first manifests itself in a morbid condition of the general system; but its seat is in the lungs and the pleura, where it causes an abundant inflammatory exudation of thick plastic matter. The lungs become rapidly filled with this matter, and increase greatly in weight. Whether pleuro-pneumonia is specifically a local or general disease is disputed, as also the manner of treatment. On the one hand bleeding and mercurial treatment, as in pleurisy and pneumonia, is recommended. On the other, evacuating remedies, maintaining the strength of the animal, and promoting the action of the skin, bowels, and kidneys. In Britain the Contagious Diseases (Animals) Act gives local authorities the power to slaughter cattle suffering from this disease, the owner receiving compensation.

Plevna, the chief town of one of the new districts into which the principality of Bulgaria is divided. It lies a little over 3 miles east of the Vid, a tributary of the Danube, and commands a number of important roads, being hence of some strategetical importance. It is noted for the gallant resistance of its garrison under Osman Nubia Pasha during the last Russo-Turkish war. Pop. 11,474.

Pleyel, IGNAZ, composer, born in Austria in 1757, died at Paris 1831. He studied under Haydn, and rapidly created a reputation in Italy, France, and England. He founded a musical establishment at Paris, which became one of the most important in Europe, and edited the Bibliothèque Musicale, in which he inserted the best works of the Italian, German, and French composers. His own works, chiefly instrumental pieces, are light, pleasing, and expressive.

Plica Polon'ica, or TRICHOMA, a disease peculiar to Poland and the immediately adjacent districts, but which at one time was also common in many parts of Germany. The roots of the hair swell, a nauseous, glutinous fluid is secreted, and the hair becomes completely matted. It is

generally confined to the head, but other parts of the body covered with hair may also be affected; and sometimes the nails become spongy and blacken.

Plinth, in architecture, the lower square member of the base of a column or pedestal. In a wall the term plinth is applied to the plain projecting band at its lowest part.

Pliny (Caius Plinius Secundus), Roman writer, commonly called *Pliny the Elder*, was born A.D. 23, probably at Comum (Como). He came to Rome at an early age, and having means at his disposal availed himself of the best teachers. He served with distinction in the field, and after having been made one of the augurs of Rome, he was appointed governor of Spain. Every leisure moment that he could command was devoted to literature and science, and his industry was so great that he collected an enormous mass of notes, which he utilized in writing his works. He adopted his nephew, Pliny the Younger, A.D. 73, and perished in the eruption of Mount Vesuvius which overwhelmed Pompeii and Herculaneum in 79. The only work of Pliny which is now extant is his Natural History, a work containing a mass of information on physics, astronomy, &c., as well as natural history proper.

Pliny (Caius Plinius Cæcilius Secundus), *the Younger*, a nephew of the former, was born A.D. 61 at Comum (Como). Having lost his father at an early age, he was adopted by his uncle, and inherited the latter's estates and MSS., and also his industry and love of literature. He filled several public offices, and was consul in A.D. 100. In A.D. 103 he was appointed proprætor or governor of the province of Pontica, which office he administered for almost two years to the general satisfaction. He was one of the most distinguished and best men of his age. The time of his death is unknown, but it is supposed that he died about the year 115. As an author he laboured with ardour, and attempted both prose and poetry. Of his writings only a collection of letters in ten books, and a panegyric on Trajan, remain.

Pli'ocene (Gr. *pleion*, more, *kainos*, recent), a geological term applied to the most modern of the divisions of the Tertiary epoch. The Tertiary series Sir C. Lyell divided into four principal groups, namely, the *Eocene* and the *Miocene* (which see), the *Older Pliocene*, and the *Newer Pliocene* or *Pleistocene*, each characterized by containing a very different proportion of fossil *recent* (or existing) species. The Newer Pliocene, the latest of the four, contains from 90 to 95 per cent of recent fossils; the Older Pliocene contains from 35 to 50 per cent of recent fossils. The Newer Pliocene period is that which immediately preceded the recent era; and by the latest system of classification it has been removed from the Tertiary and placed in the Post-tertiary or Quaternary epoch. The Pliocene period proper, or the Crag period, is that which intervened between the Miocene and the Newer Pliocene. Both the Newer and the Older Pliocene exhibit marine as well as fresh-water deposits.

Plock (plotsk), or Płock, capital of the government of the same name in Russian Poland, on the right bank of the Vistula, 78 miles N.W. of Warsaw. It has a handsome cathedral, dating from the 10th century, and a bishop's palace. Its manufactures are unimportant, but it has a large trade. Pop. 20,683. The province has an area of 4209 square miles, mostly level, and marshes and lakes abound. Fully one-third of the area is forest. Corn and potatoes are the chief agricultural products, and sheep and cattle are extensively reared. Pop. 577,490.

Plotinus, the systematic founder of Neo-Platonism, born 205 A.D., at Lycopolis, in Egypt; died in the Campagna, Italy, 270. Little is known of his early life. In his twenty-eighth year the desire to study philosophy awoke in him, but he got no satisfaction from his teachers till a friend led him to Ammonius Saccas (which see). He spent eleven years near this excellent master, and the knowledge he had acquired created an ardent desire in him to know also the teachings of the Persian and Indian philosophers. For this purpose he joined the expedition of the Emperor Gordian to the East in 242, but after the latter's death he reached Antioch with difficulty and returned to Rome, where he subsequently lived and taught. At first he taught orally, but after ten years he was prevailed upon to commit his doctrines to writing, and he composed twenty-one books, which were only put into the hands of the initiated. About 262–264 Porphyry became his pupil, and during his six years' stay in Rome, twenty-four books were written by Plotinus, and nine more after Porphyry had left for Sicily. On account of the weakness of his sight Plotinus left the correction of his works to Porphyry, who also was his literary executor, and has arranged his works in six

Enneads, which form the bible of the New Platonists. His teaching secured him great respect and popularity among the Romans. He was held to be so wise and virtuous that parents left their children to his care. He enjoyed the favour of the Emperor Gallienus, and he even succeeded in inspiring the fair sex with a desire to study philosophy. The writings of Plotinus are often obscure and even incomprehensible, but on the whole they exhibit a fertile and elevated mind and close reasoning. His system depends less upon the intrinsic truth it contains than upon its historical value, which is great both in its antecedents and consequents. Plotinus was well acquainted with the older Greek philosophy, with the Ionian and the Eleatic schools, with Plato and Aristotle and other founders of systems, and according to the eclectic tendencies of his day he believed there was a fundamental unity in these various systems. It was to Plato, however, that Plotinus looked as his great authority. He believed himself a strict follower of Plato, and his own system a legitimate development of the principles of that great philosopher.

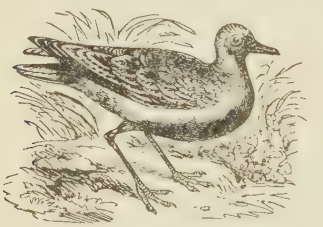
Plough, an implement drawn by animal or steam power, by which the surface of the soil is cut into longitudinal slices, and these successively raised up and turned over. The object of the operation is to expose a new surface to the action of the air, and to render the soil fit for receiving the seed or for other operations of agriculture. Ploughs drawn by horses or oxen are of two chief kinds: those without wheels, commonly called *swing-ploughs*, and those with one or more wheels, called *wheel-ploughs*. The essential parts of both kinds of plough are, the beam, by which it is drawn; the stilts or handles, by which the ploughman guides it; the coulter, fixed into the beam, by which a longitudinal cut is made into the ground to separate the slice or portion to be turned over; the share, by which the bottom of the furrow-slice is cut and raised up; and finally, the mould-board, by which the furrow-slice is turned over. The wheel-plough is merely the swing-plough with a wheel or pair of wheels attached to the beam for keeping the share at a uniform distance beneath the surface. Besides these two kinds there are *subsoil-ploughs*, *drill-ploughs*, *draining ploughs*, &c. Every part of a plough of the modern type is made of iron. *Double mould-board ploughs* are common ploughs with a mould-board on each side, employed for making a large furrow in loose soil, for earthing-up potatoes, &c. *Turn-wrest ploughs* are ploughs fitted either with two mould-boards, one on each side, which can be brought into operation alternately, or with a mould-board capable of being shifted from one side to the other, so that, beginning at one side of a field, the whole surface may be turned over from that side, the furrow being always laid in the same direction. One of these ploughs with two mould-boards is so constructed as to be dragged by either end alternately, the horses and ploughmen changing their position at the end of every furrow. Such ploughs are useful in ploughing hill-sides, as the furrows can all be turned towards the hill, thus counteracting the tendency of the soil to work downwards. In the most improved style of wheel-plough there are a larger and a smaller wheel, the former to run in the furrow, the latter on the land. These have also a second or skim coulter, for use in lea ploughing, to turn over more effectually the grassy surface. What is called a *gang-plough* is essentially a number of ploughs combined, four, six, or eight shares being fixed in one wheeled frame, and dragged by a sufficient number of horses, such ploughs being used on very large farms. — *Steam ploughs* on various principles have latterly been introduced into Britain. Some are driven by one engine remaining stationary on the headland, which winds an endless rope (generally of wire) passing round pulleys attached to an apparatus called the 'anchor,' fixed at the opposite headland, and round a drum connected with the engine itself. Others are driven by two engines, one at either headland, thus superseding the 'anchor.' As steam-ploughing apparatus are usually beyond both the means and requirements of single farmers, companies have been formed for hiring them out. In steam-ploughing it is common to use ploughs in which two sets of plough bodies and coulters are attached to an iron frame moving on a fulcrum, one set at either extremity, and pointing different ways. By this arrangement the plough can be used without turning, the one part of the frame being raised out of the ground when moving in one direction, and the other when moving in the opposite. It is the front part of the frame, or that farthest from the driver, which is elevated, the ploughing apparatus connected with the after part being inserted and doing the work. Generally two, three, or four sets of

plough bodies and coulters are attached to either extremity, so that two, three, or four furrows are made at once.

Plough-land is an equivalent expression with a *hide* of land. It is defined as containing as much land as may be tilled in a year and a day by one plough. It was fixed by 7 and 8 William III. cap. xxix., for the purpose of repairing highways, at an annual value of £50. The quantity contained in a ploughgate appears to differ in different charters.

Plough-Monday, the next Monday after Twelfth Day. On Plough Monday the ploughmen in the northern part of England used to draw a plough from door to door, and beg money for drink.

Plover, the common name of several species of grallatorial birds belonging to the genus *Charadrius*. They inhabit all parts of the world. They are gregarious, and most of them are partial to the muddy borders of



Golden Plover (*Charadrius pluviālis*).

rivers and marshy situations, subsisting on worms and various aquatic insects; but some of them affect dry sandy shores. Their general features are: bill long, slender, straight, compressed; nostrils basal and longitudinal; legs long and slender, with three toes before, the outer connected to the middle one by a short web; wings middle-sized. Most of them moult twice a year, and the males and females are seldom very dissimilar in appearance. The various species pass so imperceptibly into one another that their classification is often attended with difficulty. All nestle on the ground. They run much on the soil, patting it with their feet to bring out the worms, &c. The golden plover (*Charadrius pluviālis*), also called yellow and whistling plover, is the best known, and its flesh and its olive-green dark-spotted eggs are considered a delicacy by epicures.

Plum (*Prunus*), a genus of plants belonging to the natural order Rosaceæ, sub-order Amygdaleæ. About a dozen species are known, all inhabiting the north temperate regions of the globe. They are small trees or shrubs, with alternate leaves and white flowers, either solitary or disposed in fascicles in the axils of the leaves. The common garden plum (*P. domestica*), introduced from Asia Minor, is the most extensively cultivated, and its fruit is one of the most familiar of the stone-fruits. The varieties are very numerous, differing in size, form, colour, and taste. Some are mostly eaten fresh, some are dried and sold as prunes, others again are preserved in sugar, alcohol, syrup, or vinegar. They make also excellent jams and jellies, and the syrup from stewed plums forms a refreshing drink for invalids, and a mild aperient for children. Perhaps the most esteemed of all varieties is the green gage. (See *Green Gage.*) A very popular and easily grown sort is the *P. damascēna* or damson. The wood of the plum-tree is hard, compact, traversed with reddish veins, susceptible of a fine polish, and is frequently employed by turners and cabinet-makers. The sloe or black-thorn (*P. spinōsa*) is a species of wild plum bearing a small, round, blue-black, and extremely sour fruit. Its juice is made into prune-wine, which is chiefly employed by distillers, wine and spirit merchants, &c., for fining, colouring, purifying, and mellowing spirits.

Plumbagina'ceæ, PLUMBAGIN'EÆ, a nat. order of exogens, consisting of (chiefly maritime) herbs, somewhat shrubby below, with alternate leaves, and regular pentamerous, often blue or pink flowers. As garden plants nearly the whole of the order is much prized for beauty, particularly the Statices. The common thrift or sea-pink (*Armeria maritima*), with grass-like leaves and heads of bright pink flowers, is a familiar example. The type of this order is the genus *Plumbāgo*. It consists of perennial herbs or undershrubs, with pretty blue, white, or rose-coloured flowers in spikes at the ends of the branches. *P. europæa* is employed by beggars to raise ulcers upon their bodies to excite pity. Its root contains a peculiar crystallizable substance which gives to the skin a lead-gray colour, whence the plant has been called *leadwort*.

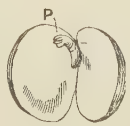
Plumba'go. See *Graphite.*

Plummet, PLUMB-LINE, a leaden or other weight let down at the end of a cord to regulate any work in a line perpendicular to the horizon, or to sound the depth of anything. Masons, carpenters, &c., use a

plumb-line fastened on a narrow board or plate of brass or iron to judge whether walls or other objects be perfectly perpendicular, or *plumb* as the artificers call it. Near a range of high mountains the plumb-line, as can be shown by special arrangements, is not perfectly true, but inclines towards the mountains; and officers in charge of the U.S. Coast and Geodetic Survey among the Hawaian Islands, have recently observed that the deviation of a plumb-line from the vertical is greater in the case of mountains in an island than in continental mountains, and greater in the neighbourhood of extinct volcanoes than in that of active volcanoes. In given localities the plumb-line also varies according to the ebb and flow of the tide.

Plumptre, Edward Hayes, Dean of Wells, born 1821. He graduated B.A. (double first class) at Oxford 1844, M.A. 1847, when he was appointed chaplain at King's College, London, and professor of pastoral theology in 1853. He became successively prebendary of St. Paul's, London (1863), rector of Pluckley, Kent (1869), vicar of Bickley, Kent (1873), principal of Queen's College, London (1875), and dean of Wells (1881). As an able theologian and preacher he was chosen a member of the Old and New Testament Revision Companies in England, select preacher at Oxford (several times), Boyle lecturer 1866–67, Grinfield lecturer 1872–74. He has written a number of valuable works on theology, many of his sermons and lectures have been published, and the reviews and religious periodicals contain numerous contributions by him. We have besides from his pen several translations, including Sophocles (1866), Æschylus (1870), Dante (1887). His latest important literary work is a Life of Thomas Ken, Bishop of Bath and Wells (1888). The degree of D. D. was conferred by Glasgow University in 1875. He died in 1891.

Plu'mule, in botany, that part of the seed which grows into the stem and axis of the future plant. In the seeds of the bean, horse-chestnut, &c., the plumule is distinctly visible, but in plants generally it is scarcely perceptible without the aid of a magnifying glass, and in many it does not appear till the seed begins to germinate. The first indication of development is the appearance of the plumule, which is a collection of feathery fibres bursting from the enveloping capsule of the germ, and which proceeds immediately to extend itself vertically upwards.



P, Plumule.

Plurality, in ecclesiastical law, signifies the holding by the same person of two or more benefices. Pluralities were forbidden by the canon law, but the bishops and the pope assumed the right of granting dispensations to hold them. They were prohibited by the Councils of Chalcedon (451), Nicæa (787), and Lateran (1215). In England pluralities in the church are forbidden excepting in particular cases, such as where two livings are within 3 miles of each other, and the value and population small.

Plus (L., more), in mathematics, signifies addition; the sign by which it is indicated is +; thus A + B, which is read A *plus* B, denotes that the quantity A is to be added to the quantity B. Plus, or its sign +, is also used to indicate a positive magnitude or relation, in opposition to *minus* −, which indicates a negative.

Plush, a fabric similar to velvet, from which it differs only in the length and density of the nap. The nap may be formed either in the warp or woof, the one in which it is being double, there being a warp and a woof for the body of the cloth, and a warp or a woof for the nap. Plushes are now made almost exclusively of silk. The cheaper qualities have a cotton backing. Some of the finest dress plushes are produced in London, plushes for gentlemen's hats come chiefly from Lyons, while common or imitation plushes are largely manufactured in Germany. Plush is now also extensively used in upholstery and decorative work.

Plutarch (plö'tärk; Greek, Ploutarchos), a learned Greek writer, born at Cheronæa in Bœotia, where he also died. Neither the year of his birth nor that of his death is accurately known, but it is generally held that he lived from the reign of Nero to that of Adrian (54–117 A.D.). He appears from his writings to have visited Italy, lectured there on philosophy, and stayed some time at Rome, where he established a school during the reign of Domitian. His Parallel Lives of Illustrious Greeks and Romans is the work to which he owes his fame. The lives are nearly all written in pairs, one Greek and one Roman, followed by a comparison of the two, and are models of biographical portraiture. We have numerous editions and translations of them. Plutarch's other works, about sixty in number,

are generally classed as *moralia*, though some of them are narrative. His writings show that he was well acquainted with the literature of his time, and with history, and that he must have had access to many books.

Pluto, in classical mythology, the god of the infernal regions, the ruler of the dead. He was a son of Cronus and Rhea, a brother of Zeus (Jupiter) and Poseidon (Neptune), and to him, on the partition of the world, fell the kingdom of the shades. He married Persephŏnē (which see). By the Greeks he was generally called *Hades* and by the Romans Orcus, Tartarus, and Dis Pater. As is the case with all other pagan deities, the accounts of Pluto vary with different writers and periods, and in later ages he was confounded with Plutus. The worship of Pluto was extensively spread among the Greeks and Romans. The cypress, the box, the narcissus, and the plant adiantum (maiden-hair), were sacred to him: oxen and goats were sacrificed to him in the shades of night, and his priests were crowned with cypress. He is represented in gloomy majesty, his forehead shaded by his hair, and with a thick beard. In his hand he holds a two-forked sceptre, a staff, or a key; by his side is Cerberus. He is often accompanied by his wife.

Plutonic Rocks, unstratified crystalline rocks, such as granites, greenstones, and others, of igneous origin, formed at great depths from the surface of the earth. They are distinguished from those called volcanic rocks, although they are both igneous; plutonic rocks having been elaborated in the deep recesses of the earth, while the volcanic are solidified at or near the surface.

Plutus, in Greek mythology, the god of riches. Zeus struck him blind because he confined his gifts to the good; and he thenceforth conferred them equally on the good and the bad. His residence was under the earth. Plutus is the subject of Aristophanes's comedy of the same name.

Pluviose, the fifth month of the French Republican calendar, including January 20 —Feb. 18 or 19. See *Calendar*.

Plymouth (plim'uth), a seaport, municipal and parliamentary borough of England, in Devonshire, at the head of Plymouth Sound, between the estuaries of the Plym and Tamar. Taken in its largest sense, it comprehends what are called the 'Three Towns,' or Devonport on the west, Stonehouse in the centre, and Plymouth proper on the east. Plymouth proper covers an area of about 1 square mile, the site being uneven and somewhat rugged, consisting of

a central hollow and two considerable eminences, one on the north, forming the suburbs, and the other, called the Hoe, on the south, laid out as a promenade and recreation ground. The old Eddystone Lighthouse has been re-erected in Hoe Park, which also contains a handsome statue of Sir Francis Drake by Bœhm. The top of the Hoe offers magnificent land and sea views. The older parts of the town consist of narrow and irregular streets devoid of architectural beauty, but the newer parts and suburbs display an abundance of elegant buildings. The guild-hall, a Gothic building, is the finest modern edifice (1870–74), and has a tower nearly 200 feet high; among other buildings are St. Andrew's

Church, the post-office, the Royal Hotel, theatre, and the athenæum. The citadel, an obsolete fortification built by Charles II., is another object of interest. Plymouth is well defended both land- and seawards by a series of forts of exceptional strength provided with heavy ordnance. Charitable and educational institutions abound; the latter include a marine biological laboratory. The manufactures are not very extensive, and chiefly connected with ships' stores; but the fisheries are valuable, and Plymouth has a large export and coasting trade. Its chief importance lies in its position as a naval station. Thanks to extensive and sheltered harbours, Plymouth rose from a mere fishing village to the rank of foremost port of England under Elizabeth, and is now as a naval port second only to Portsmouth. To secure safe anchorage in the Sound a stupendous breakwater has been constructed at a cost of about £2,000,000. The Western Harbour, or the Hamoaze (mouth of the Tamar), is specially devoted to the royal navy, and here (in Devonport, which see) are the dockyard, and Keyham steam-yard; the victualling yard, marine barracks, and naval hospital being in Stonehouse. The mercantile marine is accommodated in the Eastern Harbour, the Catwater (200 acres), or estuary of the Plym, and in Sutton Pool, and the Great Western Docks in Mill Bay. Plymouth sends two members to the House of Commons, while Devonport also sends two. Plymouth is supplied with water from Dartmoor by a *leat* or channel constructed by Sir Francis Drake. Pop. 84,179.

Plymouth, a seaport of the U. States, the seat of Plymouth county, Massachusetts, 37 miles S.S.E. of Boston, founded by the Pilgrim Fathers in 1620. It is situated in a capacious but shallow bay, and has extensive fisheries, rope and canvas factories, also iron-works. Pilgrim Hall, and a colossal monument to the pilgrims, on the top of the adjoining hill, are the chief sights of the place. Pop. 1890, 7314.

Plymouth, a growing town, Luzerne county, Pennsylvania. Coal-mining is extensively carried on. Pop. 1890, 9344.

Plymouth Brethren, PLYMOUTHITES, a sect of Christians who first appeared at Plymouth in 1830, but have since considerably extended over Great Britain, the United States, and among the Protestants of France, Switzerland, Italy, &c. They object to national churches as being too lax, and to dissenting churches as too sectarian, recognizing all as brethren who believe in Christ and the Holy Spirit as his Vicar. They acknowledge no form of church government nor any office of the ministry, all males being regarded by them as equally entitled to 'prophesy' or preach. At first they were also called Darbyites, after Mr. Darby, originally a barrister, subsequently a clergyman of the Church of England, to whose efforts their origin and the diffusion of their principles are much to be ascribed. The Plymouth Brethren professedly model themselves upon the primitive church, and at an early stage of the movement there was a tendency towards the adoption of the principle of community of goods. They also, in general, hold millennarian views, and Darby is exceedingly minute in carrying out the allegorical interpretation of the ceremonial and other figurative parts of the Old Testament. The interpretation of prophecy, as filling up in detail the entire rôle of history, is another peculiarity of Darby and the Plymouthists. They baptize adults and administer the sacrament, which each takes for himself, each Sunday. At their meetings a pause of unbroken silence ensues when no one is moved to speak. They hold both civil governments and ecclesiastical organizations to be under divine reprobation, the former as atheistic, the latter as in a state of apostasy. Theological differences early caused a split among the Plymouthists, and already during the lifetime of Darby there were three distinct divisions. Correct statistics for Europe are not available. In the United States they have 109 organizations; halls, &c., 108; members, 2279.

Plymouth Sound, an arm of the sea, on the south-west coast of England, between the counties of Devon and Cornwall. It is about 3 miles wide at its entrance, bounded by elevated land, which descends abruptly to the sea. It contains Drake Island, which is fortified, and the celebrated Plymouth Breakwater. See *Plymouth*.

Pneumatic Despatch, propulsion by means of compressed air or by forming a vacuum. Pneumatic railways have thus far proved abortive (see *Atmospheric Railway*), but propulsion by compressed air has of recent years been successfully applied to a variety of practical uses. Parcels are thus conveyed, and internal communication in warehouses, hotels, &c., is carried on by its means. The most developed application of compressed air as a motive force is in connection with the telegraph service of

large cities. Pneumatic despatch, which has proved a most useful auxiliary in securing prompt and cheap collection and distribution of telegraphic messages, was first introduced in London by Latimer Clark in 1853, improved by Varley 1858, and again by Siemens in 1863. The vehicles charged with the messages, technically called *carriers*, are forced through leaden tubes connecting the various stations, and from 1½ to 3 in. diameter, by means of air-pressure at one end, or sucked through by a partial vacuum at the other. The invention of Latimer Clark and Varley required a separate tube between each pair of stations, and admitted of only a single despatch at a time; but a system of laying tubes in circuit for the continuous transmission of despatches, by means of an uninterrupted air-current in one direction, was adopted in Berlin by Messrs. Siemens and Halske in 1863, and introduced in London in 1870. Both systems are in use in London with modifications to suit special traffic. The tubes (some 40 miles) run in all directions. In the central districts, where the transmission is heavy, the stations are connected by a double tube, a receiving and a despatching one, forming a complete circuit, with a column of air always passing through it, and which is moved either by pressure, or by vacuum, or both. The up and down lines may be opened through their entire length, or blocked by switch-boxes at an intermediate station. The terminal stations can send carriers to be stopped by the switch-box at an intermediate station; and the intermediate station, when it knows a through carrier to be coming for one of the terminii, can, if it happen to have any messages to send to that terminus, switch out the through carrier and insert its own messages without appreciable delay. The carriers in the 3-in. tubes hold about 50 messages. It is estimated that work may be performed by one of these tubes which would require six wires and twelve clerks. Pneumatic tubes are also in growing use in Liverpool, Manchester, Glasgow, Dublin, &c. The circuit system, but not with a continuous current, is extensively used in Paris. The tubes are of iron, 2 feet in diameter. Trains leave the central station at fixed intervals and make the circuit. Other European cities have similar systems. New York works the English system, but brass instead of lead tubes are employed.

Pneumatics, that branch of physics which treats of the mechanical properties of elastic fluids, and particularly of atmospheric air. The chemical properties of elastic fluids (air and gases) belong to chemistry. Pneumatics treats of the weight, pressure, equilibrium, elasticity, density, condensation, rarefaction, resistance, motion, &c., of air; it treats also of air considered as the medium of sound (acoustics), and as the vehicle of heat, moisture, &c. It also comprehends the description of those machines which depend chiefly for their action on the pressure and elasticity of air, as the various kinds of pumps, artificial fountains, &c. The weight of the air, and its pressure on all the bodies on the earth's surface, were quite unknown to the ancients, and only first perceived in the middle of the 17th century by Galileo, when a sucking-pump refused to draw water above a certain height; and to Torricelli, his pupil, belongs the honour of giving first a natural explanation of the phenomenon. See *Air*, *Air-pump*, *Atmosphere*, *Barometer*, *Gas*, *Pump*, &c.

Pneumonia (Greek, *pneumōn*, lung), acute inflammation of the lung substance. The more general symptoms are feverishness, constant pressing pain on the chest, difficult breathing, and painful cough. The base of the lung is generally attacked, and the right lung twice as often as the left, but both may be affected. Pneumonia is frequently complicated with pleurisy (which see). The patient must be kept quiet in bed, the affected parts poulticed, and the bowels attended to. Mild, nourishing diet, with medicines to stimulate the skin and to reduce fever, should be given.

Pnom-penh, the chief town of Cambodia, at the apex of the delta of the Mekong. Pop. 30,000.

Po (anciently *Padus* or *Eridānus*), the largest river of Italy. It rises on the confines of France and Piedmont in Mount Viso, one of the Cottian Alps, and receives during its long course to the Adriatic (about 450 miles) a vast number of tributary streams. It divides the great plain of Lombardy into two nearly equal parts, and is the grand receptacle for the streams flowing south from the Alps, and for the lesser waters that flow north from a part of the Apennine range. Its principal affluents are, on the left, the Baltea, Sesia, Ticino, Adda, and Mincio; on the right, the Tanaro, Trebbia, and Panaro. The Po, in spite of embankments, &c., is the cause of frequent inundations, especially near its mouth. In some places, owing to

the silt carried down, its channel is now raised above the country through which it flows. Fish are plentiful in it, including the shad, salmon, and even sturgeon.

Poa. See *Meadow-grass.*

Poaching, the trespassing on another's property for the purpose of killing or stealing game or fish. For the law relating to the poaching of game see *Game Laws.* According to the law of England, when a person's land adjoins a stream where there is no ebb and flow that person is assumed to have an exclusive right to fish in the stream as far as his land extends, and up to the middle of the stream; and so also when a person's land incloses a pond, the fish in that pond belong to him. Where several properties are contiguous to the same lake the right of fishing in that lake belongs to the proprietors, in proportion to the value of their respective titles. Exclusive right of fishing in a public river, that is, one in which there is ebb and flow up to the tidal limit, or a portion of the sea, is held by some proprietors by virtue of royal franchises granted prior to the Magna Charta. Any person, not an angler, found fish-poaching on private property is liable to a maximum fine of £5, in addition to the value of the fish; an angler's fine does not exceed £2. If the act is committed on land belonging to the dwelling-house of the owner it becomes a misdemeanour, and such a fish-poacher, when caught in the act, may be arrested by anybody. Anglers cannot be arrested, even in the latter case, but the penalty extends to £5. The owner or his servant may deprive the angler of his fishing gear in lieu of a fine. The same law applies also to Ireland. In Scotland, as a general rule, the right of catching fish other than salmon belongs to the owner of the land on the banks of the waters. As to property in salmon fishings that is held to be originally vested in the crown, not only for the rivers of Scotland but also for the coasts, and no person accordingly is allowed to fish for salmon unless he possesses a grant or charter from the crown enabling him to do so. The fact is, however, that nearly all the chief landed proprietors do possess such rights. The punishment for poaching salmon in Scotland is a fine not less than 10*s.* nor more than £5, together with the forfeiture of the fish taken, and the boat, tackle, &c., employed by the poacher, if the sheriff or justice think fit. Anyone not an angler poaching trout or any other fresh-water fish renders himself liable to a penalty of £5, besides forfeiting the fish caught. If he be caught in the act of using a net for poaching such fish he may be arrested, but not unless; but even when he may not be arrested his boat and fishing implements may be seized. A person who merely angles for trout in places where he has not got leave to fish is only liable to an action at law.

Pocahon'tas, daughter of Powhatan, a celebrated American-Indian warrior of Virginia, born about the year 1595. Some romantic incidents are told of her life, but there seem to be considerable doubts as to their truth. She is said to have shown a great friendship for the English who colonized Virginia, and to have rendered them substantial services. In 1607 she prevailed on her father to spare the life of Captain John Smith, his prisoner, and two years later frustrated a plot to destroy him and his party. After Captain Smith had left the colony she was kept as a hostage by an English expeditionary force (1612). During this detention she married Mr. Rolfe, an Englishman, who in 1616 took her on a visit to England, where she was baptized and assumed the name of Rebecca. She died the following year, and left one son, who was educated in London, and whose descendants are said to exist still in the state of Virginia.

Pochard (*Fuligula*), a sub-family of Anatidæ or ducks, inhabiting the Arctic regions. They migrate southwards in winter to the coasts of Europe and North America; and they even occur in Asia and in the southern hemisphere. They are marine in habits, and feed upon crustaceans, worms, molluscs, and aquatic plants. There are numerous species, and the flesh of several is much prized as food. A typical form and one of the best known is the *F. ferina*, the common pochard, variously called dunbird, red-headed poker, red-headed widgeon or duck. The head and neck are bright chestnut; eyes red; bill long; a broad, transverse, and dark-blue band on the upper mandible; length 16 to 17 inches; weight 1 to 2 lbs. Other familiar varieties are the *F. glaciālis*, or long-tailed duck; the scaup pochard (*F. marīla*); the tufted pochard (*F. cristāta*); and the canvas-backed duck of North America (*F. Valisneria*), so highly esteemed by epicures.

Poco (Italian for 'a little'), a term used in music in such phrases as *poco forte* (*p. f.*), rather loud; *poco animato*, with some animation; and so forth.

Pocock, Edward, an English oriental scholar, born at Oxford 1604, where he died 1691. He graduated at Oxford, and was ordained priest in 1628. While at the university he acquired a taste for oriental literature, which he was able to gratify as chaplain to the English factory at Aleppo, 1629–36. Laud engaged him to collect manuscripts and coins for the University of Oxford, and in 1636 chose him to fill the newly-founded Arabic professorship at that university. The years between 1637 and 40 he spent at Constantinople studying and collecting Arabic manuscripts. Although a man of moderate views in church and state matters, he suffered from the troubles of his times. He was appointed to the Hebrew chair at Oxford in 1648, together with the rich canonry of Christ Church; but from 1650–60 he was deprived of his church preferment. His works are of great value to oriental and biblical students.

Pod, in botany, a general term applied to various forms of seed-vessels of plants, such as the legume, the loment, the siliqua, the silicle, the follicle, the capsule, &c.

Podag'ra, that species of gout which recurs at regular intervals, generally in spring or autumn, attacking the joints of the foot, particularly of the great toe, attended with a sharp burning pain, and rendering the whole foot so sensitive that the slightest pressure, or even the agitation occasioned by a strong draught of air, causes torture. The pain can be assuaged by reducing the inflammation, promoting the secretion of the gouty matter, and by suitable diet and mode of living. See *Gout*.

Podar'gus, a genus of Australasian nocturnal birds of the goatsucker family. Like the goatsuckers their mouths have a very wide gape. By day they are excessively drowsy. There are several species, one of which, Cuvier's podargus (*P. Cuvieri*), is known among the Australian settlers by the name of 'more pork' from its strange cry.

Podestà, an Italian word derived from the Latin *potestas*, power, equivalent in its original meaning to a holder of power or authority. In the middle ages the podestà wielded almost dictatorial power in many of the Italian cities. In the modern kingdom of Italy he is the chief official of a commune, corresponding to the French *maire*.

Podgorit'za, formerly a Turkish stronghold against Montenegro, but incorporated with that principality since 1880. It lies about 35 miles north of Scutari, at the foot of a range of mountains. Pop. 5000.

Podiceps. See *Grebe*.

Podiebrad (pod'ye-brâd), George, King of Bohemia, born 1420 of a noble family, died 1471. When a mere youth he entered into the Hussite movement. In the war against Albert V. of Austria he rendered eminent services, and secured the highest esteem of the Calixtines or Utraquists. In 1444 he was chosen head of the party, became one of the two governors of Bohemia during the minority of Ladislas, Albert's posthumous son, now king of the country, and, after overcoming the Catholic opposition, sole regent in 1451. Ladislas died in 1457, and Podiebrad was elected to the throne in the following year, and crowned by the Catholic bishops in 1459. He inaugurated his reign by the introduction of various beneficent laws, wise administration, and a policy of conciliation towards the Catholics; but he was not allowed to carry out his reforms in peace. The pope, Paul II., publicly denounced him as an heretic in 1463, excommunicated him, and his legate soon produced a rising among the Catholics. A German crusade was formed against Bohemia in 1466, but the invaders were defeated in several places. Matthias Corvinus, king of Hungary and son-in-law of Podiebrad, at the instigation of the pope and the Emperor Frederick invaded Moravia; but Podiebrad's generalship was again successful, and in 1469 he hemmed in the Hungarian army at Willemow. In order to secure the aid of the Poles he assembled a diet at Prague, and declared the successor to the throne of Poland to be his own successor, while his sons should only inherit the family estates (1469). The Poles were thus immediately drawn to his side; the Emperor Frederick also declared in his favour; and his Catholic subjects became reconciled to him. Shortly after he destroyed the infantry of the Hungarians, which had again taken the field, and Matthias Corvinus hastily fled with his cavalry. He thus saw himself at last completely secured in his kingdom; but no sooner was this accomplished than he died; being succeeded by Ladislas, eldest son of Casimir IV., king of Poland, who thus united the two crowns.

Podium, in architecture, a long pedestal supporting a series of columns. It is called a *stylobate* when the columns stand on projecting parts of it.

Podo'lia, a government of South-western Russia; area, 16,224 sq. miles. The country is mostly flat, but a low branch of the Carpathians extends through it in an easterly direction. The principal rivers are the Dniester and the Bug. The climate is temperate and salubrious, the soil generally very fertile; in fact, Podolia forms one of the most valuable agricultural possessions of the Russian Empire. Manufactures are spreading rapidly, and beet-sugar, spirits, flour, and tobacco are produced in great quantities. The trade with Germany, Austria, and Odessa is extensive. Capital, Kamenetz. Pop. 1889, 2,423,755.

Podophthal'mata ('stalk-eyed'), a division of the Crustacean class, primarily distinguished by compound eyes supported upon movable stalks termed *peduncles*. This division includes the orders Stomapoda and Decapoda, the former of which is represented by the 'locust,' 'glass,' and 'opossum' shrimps, whilst the latter includes the familiar crabs, lobsters, common shrimps, hermit crabs, and their allies. See also *Crustacea*, *Crab*, *Lobster*, *Shrimp*, &c.

Podoph'yllin, a resin obtained from the root-stock of the may-apple (*Podophyllum peltatum*. See *May-apple*). It is of a brownish-yellow colour, dissolves readily in alcohol, and has been admitted to the pharmacopœias of many countries as a purgative; it is particularly beneficial in cases of sluggish liver, having much the same effect as mercury, but in some constitutions produces severe griping.

Podu'ridæ, a family of apterous (wingless) insects belonging to the order Thysanura, distinguished by the possession of an elastic forked caudal appendage, which is folded under the body when at rest, and by the sudden extension of which they are enabled to effect considerable leaps; hence their popular name of spring-tails. Their scales are favourite test objects for microscopes.

Poe, Edgar Allan, American poet and romantic writer, born at Baltimore 1809, died in the same city 1849. His father and mother were actors, and being left an orphan when a mere child he was adopted by Mr. Allan, a wealthy Baltimore merchant. His early education he received at Stoke-Newington, London, 1816–21, and on his return to America attended a school at Richmond, Virginia, and finally entered the University of Charlottesville. Here he displayed extraordinary talents, but also contracted a taste for fast living which occasioned quarrels with his benefactor, and caused him to quit America for Europe. He took part in the struggles of the Greeks for independence, and for a few years led an erratic life on the Continent. In 1829 he returned to America, a reconciliation with Mr. Allan took place, and he was sent as cadet to the military academy at West Point. Further irregularities brought about a complete rupture with Mr. Allan, and Poe enlisted as a private soldier, however only to desert later on. His literary career may be said to have begun in 1835, when he gained the prize offered by the Baltimore Saturday Visitor for a tale and a poem. He then became successively editor of the newly-founded Southern Literary Messenger at Richmond, contributor to the New York Review at New York, and editor of Burton's Gentleman's Magazine and Graham's Magazine at Philadelphia. For these periodicals he wrote a number of tales, exhibiting a weird yet fascinating imagination. While at Richmond, in 1836, he married his cousin, Virginia Clemm, a beautiful and amiable girl. The great event in Poe's life was the publication at New York in 1845 of his poem the Raven, which spread his fame to the whole English-speaking world. For this remarkable production Poe is said to have received $10. He was subsequently connected with The Home Journal and The Broadway Journal. In 1848 his wife died. Passing through Baltimore in 1849, on his way to New York to make preparations for a second marriage, he was led to excessive drinking, and died from its effects at the hospital. Poe's career is sad enough, and his faults were sufficiently numerous, but until John H. Ingram in 1874 published a biography of him, based on documents and ascertained facts, the public were generally led to believe by Rufus Griswold, his first biographer, that his character was very much blacker than it really seems to have been.

Poe-bird. See *Honey-eater*.

Poelenburgh (pö'len-burh), Cornelis van, Dutch painter, born at Utrecht in 1586, became a pupil of Bloemaart, and afterwards went to Italy. In 1627 he returned to Utrecht, where he died in 1667. He confined himself principally to small landscapes, in which he excelled. Charles I. invited him to England, where he painted a portrait of the king and other works. His works are rare, and esteemed for delicacy of touch and sweetness of colouring.

Poe'rio, CARLO, an Italian statesman, born at Naples 1803, died at Florence 1867. Like his father Giuseppe Poerio, he often opposed the actions of the Bourbon kings of Naples, and frequently devoted his talents as an advocate to the cause of political offenders. He thus became a suspect, and from 1837–48 suffered various terms of imprisonment. The revolution of the latter year released him from prison and placed him at the head of the Neapolitan police, and of the ministry of public instruction, but, finding it impossible to get the Bourbons to fulfil their promises, he resigned. He sat in the new parliament and acted with the opposition. In July, 1849, he was arrested and condemned without defence to twenty-four years' imprisonment. The barbarous treatment he received in prison gave occasion to Gladstone's famous Two Letters to Lord Aberdeen, written in 1851 from Naples. In 1859 his sentence was commuted to transportation to South America; but he and his companions in misfortune effected a landing at Cork in Ireland, and thence proceeded to London. In 1861 he was elected vice-president of the Italian chamber of deputies, and remained till his death one of the chiefs of the constitutional liberal party.

Poet Laureate. See *Laureate.*

Poetry (from *poet*, the Greek *poiētēs*, a maker or creator), that one of the fine arts which exhibits its special character and powers by means of language; or, according to Aytoun, the art which has for its object the creation of intellectual pleasures by means of imaginative and passionate language, and language generally, though not necessarily, formed into regular numbers. It has also been defined as the concrete and artistic expression of the human mind in emotional and rhythmical language. It is the earliest form of literature, and also the final and ideal form of all pure literature; its true place lying between music on the one hand, and prose or loosened speech on the other. The poet deals with language as the painter does with colour, sometimes invading the domain of music and sometimes that of prose, or rather he brings prose into the domain of poetry. The two great classes of poetic impulse are dramatic imagination and lyric imagination. Partaking of the character of both is epic or narrative poetry. (See *Epic.*) To the dramatic class belong tragedy and comedy; to the lyric belong the song, hymn, ode, anthem, elegy, sonnet, and ballad, though the last-named frequently has a kind of epic character. Other forms, such as 'didactic' poetry, 'satirical' poetry, are also in use, but it is a question if they enter into the circle of poetry at all. See separate articles on the various species. *Poetics* is the theory of poetry; that branch of criticism which treats of the nature and laws of poetry.

Pogge. Same as *Menhaden* (which see).

Poggio Bracciolini (pod'jō brât-chō-lē'ni), an Italian scholar and prolific writer, born 1380, died 1459. He came early under the influence of the revival of literature kindled in Italy by Petrarch and Boccacio. About 1402 he became writer of the apostolic letters under Boniface IX., and for fifty years remained connected with the papal curia in posts of confidence and dignity. He was a great enthusiast for literature, and unearthed a mass of valuable works, which hitherto had been unknown. His own writings embrace a variety of subjects, and he excelled as a polemical writer.

Poictiers. See *Poitiers.*

Poinding, in Scotch law, a legal proceeding by which the property of a debtor's movables is transferred to the creditor.

Point, in geometry, is a quantity which has no parts, or which is indivisible, or which has position without magnitude. Points may be regarded as the ends or extremities of lines. If a point is supposed to be moved in any way, it will by its motion describe a line.

Point-de-Galle. See *Galle.*

Pointe-à-Pitre (pwânt-à-pē-tr), the principal port of the French W. Indian island Guadeloupe, on the south-west coast of Grande-Terre, and one of the most important commercial towns of the Antilles. The town, mostly built of wood, was destroyed by fire in 1780, by an earthquake in 1843, and again by fire in 1871. Pop. 18,380.

Pointed Architecture, a name for Gothic (which see).

Pointer Dog, a breed of sporting dogs, nearly allied to the true hounds. The original breed is Spanish, but a cross with the fox-hound is now generally used. It is smooth, short-haired, generally marked black and white like the fox-hound, but occasionally a uniform black. It derives its name from its habit of stopping and pointing with the head in the direction of game, discovered by a very acute sense of smell. The dog once having pointed remains perfectly quiet. This faculty in the pointer is hereditary, but is better developed by training.

Poison, any agent capable of producing a morbid, noxious, dangerous, or deadly effect upon the animal economy, when introduced either by cutaneous absorption, respiration, or the digestive canal. Poisons are divided, with respect to the kingdom to which they belong, into animal, vegetable, and mineral; but those which proceed from animals are often called *venoms*, whilst those that are produced by disease have the name *virus*. With respect to their effects they have been divided into four classes, namely, irritant, narcotic, narcotico-acrid, and septic or putrescent. Many poisons operate chemically, corroding the organized fibre, and causing inflammation and mortification. To this class belong many metallic oxides and salts, as arsenic, one of the most deadly poisons; many preparations of copper, mercury, antimony, and other metals; the mineral and vegetable acids; the substance derived from some plants, as the spurges and mezereon; and cantharides, from the animal kingdom. Other poisons exercise a powerful action upon the nerves and a rapid destruction of their energy. These are the sedative or stupefying poisons, and belong for the most part to the vegetable kingdom. Opium, hemlock, henbane, belladonna, are the best-known forms of this poison. Prussic acid, a poison obtained from the kernels of several fruits, the cherry-laurel, &c., is one of the most rapid destroyers of life. Among plants there are many which unite the properties of both kinds, as the common foxglove, and the monkshood or aconite. An alkaloid is extracted from the latter, $\frac{1}{10}$th of a grain of which has proved fatal. Another class of poisons suddenly and entirely cause a cessation of some function necessary to life. To this class belong all the kinds of gas and air which are irrespirable, suffocating vapours, as carbonic acid gas, fumes of sulphur and charcoal, &c. Many preparations of lead, as acetate or sugar of lead, carbonate or white-lead, &c., are to be counted in this class. The effects of poisons materially depend on the extent of the dose, some of the most deadly poisons being useful remedies in certain quantities and circumstances. Antidotes naturally vary with the different kinds of poisons. They sometimes protect the body against the operation of the poison, sometimes change this last in such a manner that it loses its injurious properties, and sometimes remove or remedy its violent results. Thus in cases of poisoning by acrid and corrosive substances we use the fatty, mucilaginous substances, as oil, milk, &c., which sheathe and protect the coats of the stomach and bowels against the operation of the poison. Against the metallic poisons substances are employed which form with the poison insoluble compounds, such as freshly prepared hydrated oxide of iron, or dialysed iron for arsenic, albumin (white of egg) for mercury; Epsom or Glauber's salts for lead. Lime, chalk, and magnesia are the best remedies for the powerful acids. For cantharides, mucilage, gruel, and barley-water are employed. We oppose to the alkaline poisons the weaker vegetable acids, as vinegar. Prussic acid is neutralized by alkalies and freshly precipitated oxide of iron. To arouse those poisoned by opium, we use coffee and ammonia, and belladonna as an antagonistic drug. Chloral-hydrate poisoning is similarly treated; and for strychnia or nux vomica, animal charcoal in water and chloral-hydrate are used. In Great Britain the sale of poison is regulated and restricted by the Pharmacy Acts. Poisoning was common in ancient Rome, and in France and Italy during the 17th century. See *Aqua Tofana*, *Brinvilliers*.

Poison-nut, a name for *Strychnos nux-vomica*, an evergreen tree of the natural order Loganiaceæ, the seeds of which yield strychnine. (See *Nux-vomica*.) Also a name for the *Tanghinia venenifera*, of the natural order Apocynaceæ, the fruit of which is a drupe inclosing a kernel extremely poisonous. It used to be employed in Madagascar as an ordeal-test of guilt or innocence, the result generally being the death of the suspected person.

Poitiers (pwâ-tyā), or POICTIERS, a town of France, on the Clain, formerly capital of the province of Poitou, at present of the department of the Vienne. The town occupies a large space, the houses being often surrounded by gardens and orchards; the streets are narrow and ill-paved. The principal edifice is the cathedral, founded by Henry II. of England about 1162. Poitiers is one of the most ancient towns of France, and the vestiges of a Roman palace, of Roman baths, of an aqueduct, and an amphitheatre still remain. Two famous battles were fought in its vicinity, that in which Charles Martel defeated the Saracen army in 732, and that between the French under their king John II. and the English under Edward the Black Prince in 1356. The manufactures are unimportant, but there is a large trade. Pop. 1891, 37,497.

Poitiers, Diana of. See *Diana of Poitiers.*

Poitou (pwà-tö), one of the old provinces of France, between Brittany and Anjou on the north, Berry on the east, the Atlantic on the west, and Angoumois and Saintonge on the south. The departments of Vienne, Deux-Sèvres, and Vendée have been formed out of this province. Henry II. of England acquired possession of Poitou by his marriage with Eleanor, heiress of the last Duke of Aquitaine. Philip Augustus conquered it.

Poker, an American game of cards for two or more persons, originally played with only twenty cards, all below the tens being excluded, but now played with the full pack.

Pokeweed, the *Phytolacca decandra,* a North American branching herbaceous plant, order Phytolaccaceæ, which is naturalized in some parts of Europe and Asia. Its root acts as a powerful emetic and cathartic, but its use is attended with narcotic effects. Its berries are said to possess the same quality; they are employed as a remedy for chronic and syphilitic rheumatism, and for allaying syphiloid pains. The leaves are extremely acrid, but the young shoots, which lose this quality by boiling in water, are eaten in the United States as asparagus.

Pola, a town on the Adriatic, the principal naval port of Austria-Hungary, 55 miles south of Trieste. It is an ancient place, and was for a lengthened period the principal town of Istria. Its former importance is well attested by architectural remains, chief among which are a colossal and well-preserved amphitheatre and two temples. Pola had sunk to the level of a mere fishing-place with some 800 or 900 inhabitants, when the Austrian government, tempted by excellent harbour accommodation, selected it as their chief naval station; and by the erection of dockyards, of an arsenal, barracks, and other government establishments, infused new life into it. The entrance to the harbour is narrow, but the water is deep, and within it expands into a large basin, landlocked and safe. Forts and batteries on hills forming the background protect the harbour. Pop., including garrison, 27,173.

Polacca. See *Polonaise.*

Polacca, or Polacre, a three-masted vessel used in the Mediterranean. The masts are usually of one piece, so that they have neither tops, caps, nor cross-trees. It carries a fore-and-aft sail on the mizzen-mast, and square sails on the main-mast and fore-mast.

Pol'and, an extensive territory of Central Europe, which existed for many centuries as an independent and powerful state; but having fallen a prey to internal dissensions, was violently seized by Austria, Prussia, and Russia as a common spoil, partitioned among these three powers, and incorporated with their dominions. In its greatest prosperity it had at least 11,000,000 of inhabitants, and an area of 350,000 square miles, and immediately before its first partition an area of about 282,000 square miles, stretching from the frontiers of Hungary and Turkey to the Baltic, and from Germany far east into Russia, forming one compact kingdom. With the exception of the Carpathians, forming its south-western boundary, and a ridge of moderate elevation penetrating into it from Silesia, the country presents the appearance of an almost unbroken plain, composed partly of gently-undulating expanses, partly of rich alluvial flats, partly of sandy tracts, and partly of extensive morasses. Its principal streams are the Vistula, the Niemen, and the Dwina, all belonging to the basin of the Baltic; and the Dniester, South Bug, and Dnieper, with its tributary, Pripet, belonging to the basin of the Black Sea. The physical configuration of the country makes it admirably adapted for agriculture. Next to grain and cattle its most important product is timber.

The Poles, like the Russians, are a Slavonic race, and are first spoken of as the Polani, a tribe or people between the Vistula and Oder. The country was divided into small communities until the reign of Mieczyslaw I. (962-992) of the Piast dynasty, who renounced paganism in favour of Christianity, and was a vassal of the German emperor. He was succeeded by Boleslaw the Great (992-1025), who raised Poland into an independent kingdom and increased its territories. In succeeding reigns the country was involved in war with Germany, the heathen Prussians, the Teutonic knights, and with Russia. The last of the Piast dynasty was Casimir the Great (1364-70), during whose reign the material prosperity of Poland greatly increased. He was succeeded by his nephew, Louis of Anjou, king of Hungary, whose daughter, Hedwig, was recognized as 'king' in 1384, and having married Jagello, prince of Lithuania, thus established the dynasty of the Jagellons, which lasted from 1386 to 1572.

During this period Poland attained its most powerful and flourishing condition. In 1572 the Jagellon dynasty became extinct in the male line, and the monarchy, hitherto elective in theory, now became so in fact. The more important of the elective kings were Sigismund III. (1587–1637), Wladislaw or Ladislaus IV. (1632–48), John Casimir (1648–69), and the Polish general Sobieski, who became king under the title of John III. (1674–96). He was succeeded by Augustus II., Elector of Saxony, who got entangled in the war of Russia with Charles XII., and had as a rival in the kingdom Stanislaus Lesczynski. Augustus III. (1733–63) followed, and by the end of his reign internal dissensions and other causes had brought the country into a state of helplessness. In 1772, under the last feeble king Stanislaus Augustus (1764–95), the first actual partition of Poland took place, when about a third of her territories were seized by Prussia, Austria, and Russia, the respective shares of the spoil being Prussia 13,415 square miles, Austria 27,000 square miles, and Russia 42,000 square miles. What remained to Poland was completely under Russian influence. Another partition in 1793 gave Russia nearly 97,000 square miles and Prussia 22,500 square miles. A third partition took place in 1795 after the heroic attempt of Kosciusko to save his country, and the last king of Poland became a pensionary of the Russian court. The successive partitions gave Russia upwards of 180,000 square miles, Austria about 45,000 square miles, and Prussia 57,000 square miles. From 1815 to 1830 Russian Poland was a constitutional monarchy with the emperor as king, but the Poles, taking occasion of the French revolution, at the latter date rashly engaged in an insurrection, which only hastened their complete absorption in Russia. The name Kingdom of Poland indeed remains, but all the autonomic institutions of the country have been swept away, and the whole country is being rapidly Russified. The Polish language has been entirely superseded by Russian in all courts of law, educational establishments, and public offices; and all official correspondence must be in Russian. The population in 1889 was 8,385,807, of whom fully 71 per cent were R. Catholics.

The Polish language belongs to the Slavic division of the Aryan or Indo-European tongues. It is remarkable for its flexibility, richness, power, and harmony; its grammatical structure is fully developed and established, and its orthography is precise. The Polish literature reaches back to a more remote period than that of any other Slavonic language except the Bohemian. The oldest monuments consist of warlike, historical, political, and religious poems, more especially the last; but the Latin language, fostered by the church, was used exclusively by Polish writers for several centuries. The 'golden age' of Polish literature was from 1521 to 1621. To this period belong Nicolas Rej (died 1568) and Jan Kochanowski (died 1584), who both attained eminence as poets, the former in satire, allegory, didactic poetry, &c., the latter as a lyrist of the highest rank. Among the other poets of the century were Szarzynski (died 1581), and Szymonowicz (Simonides), author of Polish Idylls. It was in the 16th century also that the first histories in the language of the people were written. This flourishing period of Polish literature was followed by a period of Jesuit supremacy and literary decline, which lasted till about the middle of the 18th century. About that time the influence of the French civilization was widely felt in Poland, and prepared the way for the revival of letters. The most distinguished authors of the latter part of the 18th century are Naruszewicz, who wrote odes, idylls, satires, &c., and Krasicki (1734–1801), who also distinguished himself in various fields. Among modern Polish poets may be noted Mickiewicz (1798–1855), Krasinski (1812–59), Slowacki (1809–49), Zaleski (1802–86). Kraszewski, novelist and political and historical writer, is one of the most prolific of present-day Polish authors. Most departments of literature have been successfully cultivated by modern Polish writers, but comparatively few have attained a European reputation.

Polar Bear. See *Bear.*

Polar Circles, two imaginary circles of the earth parallel to the equator, the one north and the other south, distant 23° 28′ from either pole. See under *Arctic.*

Polar Co-ordinates. See *Co-ordinates.*

Polar Distance, the angular distance of any point on a sphere from one of its poles; more especially, the angular distance of a heavenly body from the elevated pole of the heavens. It is measured by the intercepted arc of the circle passing through it and through the pole, or by the corresponding angle at the centre of the sphere.

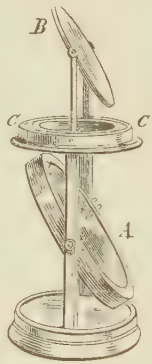
According as the north or south pole is elevated we have the *north polar distance* or the *south polar distance*.

Polar Expeditions. See *North Polar Expeditions* and *South Polar Expeditions*.

Polar Forces, in physics, forces that are developed and act in pairs with opposite tendencies, as in magnetism, electricity, &c.

Pola'ris, the pole-star, which see.

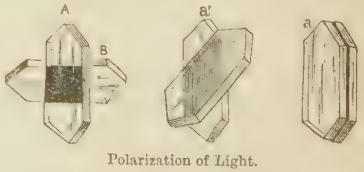
Polar'iscope, an optical instrument, various kinds of which have been contrived, for exhibiting the polarization of light, or for examining transparent media for the purpose of determining their polarizing power. The important portions of the instrument are the polarizing and analysing plates or prisms, and these are formed either of natural crystalline structures, such as Iceland-spar and tourmaline, or of a series of reflecting surfaces artificially joined together. The accompanying figure shows Malus' polariscope. A and B are the reflectors, the one serving as polarizer the other as analyser, each consisting of a pile of glass plates. Each reflector can be turned about a horizontal axis, and the upper one, or analyser, can also be turned about on a vertical axis, the amount of rotation being measured on the horizontal circle C C. See *Polarization of Light*.



Polariscope.

Polarity, that quality of a body in virtue of which peculiar properties reside in certain points called poles; usually, as in electrified or magnetized bodies, properties of attraction or repulsion, or the power of taking a certain direction; as, the *polarity* of the magnet or magnetic needle, whose pole is not that of the earth, but a point in the Polar Regions. A mineral is said to possess *polarity* when it attracts one pole of a magnetic needle and repels the other.

Polarization of Light, an alteration produced upon light by the action of certain bodies by which it is made to change its character A common ray of light exhibits the same properties on all sides, but any reflected or refracted ray, or a ray transmitted through certain media, exhibits different properties on different sides, and is said to be polarized. The polarization of light may be effected in various ways, but chiefly in the following:—(1) By reflection at a proper angle (the 'polarizing angle') from the surfaces of transparent media, as glass, water, &c. (2) By transmission through crystals possessing the property of double refraction, as Iceland-spar. (3) By transmission through a sufficient number of transparent uncrystallized plates placed at proper angles. (4) By transmission through a number of other bodies imperfectly crystallized, as agate, mother-of-pearl, &c. The knowledge of this singular property of light has afforded an explanation of some interesting phenomena in optics. A simple example of polarization may be illustrated by two slices of the semi-transparent mineral tourmaline cut parallel to the axis of the crystal. If one is laid upon the other in the positions A B (see fig. below) they form an opaque combination. If one is turned round upon the other at various angles it will be found that greatest transparency is produced in the position corresponding with *a b* (which represents the natural position they originally occupied in the crystal), an intermediate stage being that shown at *a' b'*. The light which has passed through the one plate is polarized, and its ability to pass through the other plate is thus altered. Reflection is another very common cause of polarization. The *plane of polarization* is that particular plane in which a ray of polarized light incident at the polarizing angle is most copiously reflected. When the polarization is produced by reflection the plane of reflection is the plane of polarization. According to Fresnel's theory, which is that generally received, the vibrations of light polarized in any plane are perpendicular to that plane. The vibrations of a ray reflected at the polarizing angle are



Polarization of Light.

accordingly to be regarded as perpendicular to the plane of incidence and reflection, and therefore as parallel to the reflecting surface. Polarized light cannot be distinguished from common light by the naked eye; and for all experiments in polarization two pieces of apparatus must be employed—one

to produce polarization, and the other to show it. The former is called a *polarizer*, the latter an *analyser;* and every apparatus that serves for one of these purposes will also serve for the other. One such apparatus is shown in the article *Polariscope.* The usual process in examining light with a view to test whether it is polarized, consists in looking at it through the analyser, and observing whether any change of brightness occurs as the anaylser is rotated. There are two positions, differing by 180°, which give a minimum of light, and the two positions intermediate between these give a maximum of light. The extent of the changes thus observed is a measure of the completeness of the polarization of light. Very beautiful colours may be produced by the peculiar action of polarized light; as for example, if a piece of selenite (crystallized gypsum) about the thickness of paper is introduced between the polarizer and analyser of any polarizing arrangement, and turned about in different directions, it will in some positions appear brightly coloured, the colour being most decided when the analyser is in either of the two critical positions which give respectively the greatest light and the greatest darkness. The colour is changed to its complementary by rotating the analyser through a right angle; but rotation of the selenite, when the analyser is in either of the critical positions, merely alters the depth of the colour without changing its tint, and in certain critical positions of the selenite there is a complete absence of colour. A different class of appearances are presented when a plate, cut from a uniaxial crystal by sections perpendicular to the axis, is inserted between the polarizer and the analyser. Instead of a broad sheet of uniform colour, there is exhibited a system of coloured rings, interrupted when the analyser is in one of the two critical positions by a black or white cross. Observations of this phenomenon affords in many cases an easy way of determining the position of the axis of the crystal, and is therefore of great service in the study of crystalline structure. Crystals are distinguished as dextro-gyrate or lævo-gyrate, according as their colours ascend by a right-handed or left-handed rotation of the analyser horizontally. Glass in a state of strain exhibits coloration when placed between a polarizer and analyser, and thus we can investigate the distribution of the strain through its substance. Unannealed glass is in a state of permanent strain. A plate of ordinary glass may be strained by a force applied to its edges by means of a screw. The state of strain may be varied during the examination of the plate by polarized light. A plate of quartz (a uniaxial crystal) cut at right angles to the optic axis exhibits, when placed between an analyser and polarizer, a system of coloured rings like any other uniaxial crystal; but we find that the centre of the rings, instead of having a black cross, is brightly coloured—red, yellow, green, blue, &c., according to the thickness of the plate.

Polder, the name given in the Netherlands to an area of land reclaimed from the sea, a marsh, or a lake by artificial drainage, protected by dykes, and brought under cultivation. The polders were for the most part formerly permanently submerged areas. The usual method of procedure in the formation of a polder is to inclose the portion to be reclaimed by an embankment, and construct a channel having its bed sufficiently high to cause a current towards the sea or river. The water is then pumped into this canal by means of pumping apparatus driven by steam or otherwise. See *Netherlands.*

Pole, the name given to either extremity of the axis round which the earth revolves. The northern one is called the *north pole,* and the southern the *south pole.* Each of these poles is 90° distant from every part of the equator. In astronomy, the name is given to each of the two points in which the axis of the earth is supposed to meet the sphere of the heavens, forming the fixed point about which the stars appear to revolve. In a wider sense a pole is a point on the surface of any sphere equally distant from every part of the circumference of a great circle of the sphere; or a point 90° distant from the plane of a great circle, and in a line passing perpendicularly through the centre, called the axis. Thus the zenith and nadir are the *poles* of the horizon. So the *poles* of the ecliptic are two points of the sphere whose distance from the poles of the world is equal to the obliquity of the ecliptic, or they are 90° distant from every part of the ecliptic. *Pole,* in physics, is one of the points of a body at which its attractive or repulsive energy is concentrated, as the poles of a magnet, the north pole of a needle, the poles of a battery.

Pole, Perch, or Rod, a measure of length containing 16½ feet or 5½ yards. Sometimes the term is used as a superficial measure, a

square pole denoting $5\frac{1}{2} \times 5\frac{1}{2}$ yards, or $30\frac{1}{4}$ square yards.

Pole, Reginald, cardinal and statesman, born in Staffordshire 1500, died 1558. He was the son of Sir Richard Pole, Lord Montacute, cousin to Henry VII., by Margaret, daughter of the Duke of Clarence, brother to Edward IV. He was educated at Oxford, and had several benefices conferred on him by Henry VIII., with whom he was a great favourite. In 1519 he visited Italy, and fixed his residence at Padua. He returned to England in 1525, but about 1531 lost the favour of Henry by his opposition to the divorce of Queen Catherine. He retired to the Continent for safety, was attainted, and his mother and brother were executed. On the accession of Mary (1553) he returned to England as papal legate, and on the death of Cranmer became Archbishop of Canterbury, and was at the same time elected chancellor of the Universities of Oxford and Cambridge. He died in Lambeth Palace the day after Mary's death. He seems to have been noted for his mildness, generosity, and comparative moderation, in an age when persecution was deemed lawful on all sides.

Pole-axe, an axe attached to a pole or handle of which the length varies considerably. It was formerly used by mounted soldiers, and in the navy for boarding purposes.

Polecat, a name common to several species of digitigrade carnivora of the weasel family (Mustelidæ). The common polecat (*Mustēla putorius* or *Putorius fœtidus*) is found in most parts of Europe. Its body is about 17 inches long, and the tail 6 inches. The colour is dark brown. It is a nocturnal animal, sleeping during the day and searching for its prey at night. It is especially destructive to poultry, rabbits, and game, as pheasants, so that in Britain it is being rapidly exterminated by gamekeepers, farmers, and others. Frogs, toads, newts, and fish are often stored as food by this voracious animal. It has glands secreting a fetid liquor, somewhat like that of the American skunk, which it ejects when irritated or alarmed. The name of 'Foumart' is also applied to the polecat; and its fur, which is imported in large quantities from northern Europe, is known as that of the 'Fitch.' Its hairs form a superior kind of artists' brushes.

Polem'ics, the art or practice of disputation generally, but in a special sense that branch of theological learning which pertains to the history or conduct of ecclesiastical controversy.

Polemonia'ceæ, a nat. order of monopetalous exogens with a trifid stigma, three-celled fruit, and seeds attached to an axile placenta, the embryo lying in the midst of albumen. They consist for the most part of gay-flowered herbaceous plants, natives of temperate countries, and particularly abundant in the north-western parts of America. They are of no economical importance. Some are cultivated for their beauty, the well-known phlox being one. *Polemonium cœruleum*, known as Greek valerian or Jacob's ladder, is the only British species.

Polem'oscope, a sort of stand or frame high enough to rise above a parapet or other similar object, having a plane mirror at top so fitted as to reflect any scene upon another mirror below, and thus enable a person to see a scene in which he is interested without exposing himself.

Polen'ta, a preparation of either semolina, Indian-corn, or chestnut-meal, made into a porridge and variously flavoured: a common article of diet in Italy and France. It is allowed to boil until it thickens, and is then poured into a dish, where it becomes firm enough to be cut into slices.

Pole-star, the star α of the constellation Ursa Minor, situated about 1° 20′ from the north celestial pole, round which it thus describes a small circle. It is of the second magnitude, and is of great use to navigators in the northern hemisphere. Two stars called the pointers, in the constellation Ursa Major (the Great Bear, commonly called the Plough), always point in the direction of the pole-star, and enable it to be found readily.

Polian'thes, a genus of plants belonging to the nat. order Amaryllidaceæ. They are natives of the East Indies and S. America, and mostly require the aid of artificial heat, under shelter of frames and glasses, to bring them to flower in perfection. The *P. tuberosa* or *tuberose* is well known for its delicious fragrance. See *Tuberose*.

Police (po-lēs′), the system instituted by a community to maintain public order, liberty, and the security of life and property. In its most popular acceptation the *police* signifies the administration of the municipal laws and regulations of a city or incorporated town or borough. The primary object of the police system is the prevention of crime and the pursuit of offenders; but it is also subser-

vient to other purposes, such as the suppression of mendicancy, the preservation of order, the removal of obstructions and nuisances, and the enforcing of those local and general laws which relate to the public health, order, safety, and comfort. The term is also applied to the body of men by which the laws and regulations are enforced. A police force may be either open or secret. By an open police is meant officers dressed in their accustomed uniform, and known to everybody; while by a secret police is meant officers whom it may be difficult or impossible to distinguish from certain classes of citizens, whose dress and manners they may think it expedient to assume, in order that they may the more easily detect crimes, or prevent the commission of such as require any previous combination or arrangement. This latter class of officer is termed in Britain and America a *detective*. See *Constable*.

The police system in England, as at present organized, dates from 1829, when the remodelling of the police system of the metropolis led the way to the adoption of a uniform system for the whole country. In 1829 Sir Robert Peel got an act passed 'for improving the police in and near the metropolis.' Several modifications were introduced by subsequent acts of parliament, especially by 2 and 3 Vict. caps. xlvii. and xciv. (1839); and other cities and boroughs from this time forward successively acquired, by separate acts of parliament, the necessary powers to enable them to institute and maintain a police force on the model of the metropolitan force. In 1839 and 1840 acts were passed providing for the appointment of a county constabulary, organized and maintained in accordance with rules prescribed by the secretary of state for the home department. The county magistrates, however, were left the option of taking advantage of these acts, and accordingly many counties took no steps in the matter. But by 19 and 20 Vict. cap. lxix. (1856) it was made compulsory, and there is now a county constabulary force in every county (as well as a borough police), which reports annually to the secretary of state, the force being under the periodical inspection of officers appointed by the crown. By the Local Government Act of 1888 the management of the county police is put under the county council and justices jointly; the police of boroughs having a population of less than 10,000 being also put under the county council. The total number of the police in England and Wales is about 37,300. Of these the metropolitan police number fully 14,000, forming a distinct body directly under the home secretary. The police are supported partly by local assessment, partly by the general revenue of the country.

In Scotland the organization of an efficient police in the large towns dates from 1833, when a statute was passed enabling burghs to establish a general system of police. The force in towns and populous places is at present regulated by the General Police Act of 1862, and the expense of the police establishments is provided for by an assessment on the inhabitants, supplemented by a grant from government. The management is intrusted to certain commissioners chosen by the inhabitants paying assessment. Large cities, such as Glasgow, Edinburgh, and others, have special police acts of their own. The rural police organized under the law of 1857 is now under the control of the county councils, to which the management of the police in all burghs with less than 7000 of a population was also entrusted by the Local Government Act. The Scottish constabulary is about 4000 strong. The Irish police consists of two semi-military bodies—the Royal Irish Constabulary, numbering about 13,000 men, and the Dublin Metropolitan Police, about 1200. The Irish police are almost entirely maintained by imperial funds. The police of India and the colonies are in the main modelled on those of the United Kingdom, though they vary in details. The total police force of the whole empire numbers upwards of 210,000 men.

In the United States the provisions for repression of crime and the detection and arrest of criminals were copied from those of Great Britain. In 1857 the legislature of New York passed an act for the establishment of a metropolitan police force. There have been subsequent modifications, and the present New York police may be taken as the model followed in American cities generally.

Police Burgh. See *Burgh*.

Policinello. See *Punchinello*.

Policy of Insurance. See *Insurance*.

Polignac (pol-in-yàk), Jules Auguste Armand Marie, Prince de, a French statesman, belonging to an ancient French family, born at Paris 1780, died at St. Germain 1847. After the restoration he was appointed adjutant-general to the king, and entered the chamber of peers. In 1820 he obtained from the pope the title of a Roman

prince. In 1823 he succeeded Châteaubriand as ambassador at London; but after the accession of Charles X. spent the greater part of his time in Paris. He was successively minister of foreign affairs and president of the council. At the revolution of 1830 he was apprehended and condemned to perpetual imprisonment. He remained in the fortress of Ham till the amnesty of 1836 allowed him to take up his residence in England. He was ultimately permitted to return to France. He was the author of Considérations Politiques (1832). Several other members of the family were men of some note.

Polignano (po-lē-nyä'no), an Italian town, province of Bari, on the Adriatic, 26 miles E.S.E. of Bari, on the Bari-Brindisi railway. There is a trade in lemons and oranges. Pop. 7855.

Polillo, one of the Philippine Islands, E. of Luzon; length, 30 miles; breadth, 20 miles.

Polishing is the name given to the process by which the surface of a material is made to assume a perfectly smooth and glossy appearance, usually by friction. The article to be polished must first be made smooth and even, after which the polishing begins. In the case of wood the process is commonly effected by rubbing with French polish (which see). In metals, by polishing-steel or blood-stone, or by wood covered over with leather, and on which pulverized tripoli, chalk, tin-putty, &c., is sprinkled. In glass and precious stones, by tin-putty and lead siftings; in marble, by tin-putty and tripoli; in granite and other hard stones, by tripoli and quicklime.

Polishing-powder, a preparation of plumbago for polishing iron articles; also a composition variously made up for cleaning gold and silver plate. See *Plate-powder*.

Polishing-slate, a gray or yellowish slate, composed of microscopic infusoria, found in the coal-measures of Bohemia and in Auvergne, and used for polishing glass, marble, and metals.

Politian, Angelo Ambrogini, Italian scholar, known also as *Poliziano* or *Politianus*, born 1454, died 1494. The first production which brought him into notice was a Latin poem on the tournament of Giulio de' Medici. He assumed the ecclesiastical habit, and acquired the favour of Lorenzo de' Medici, who made him tutor to his children, and presented him with a canonry in the cathedral of Florence. In 1484 he visited Rome, and after his return to Florence he lectured with distinguished success on the Latin and Greek languages, and likewise on philosophy. He wrote an Account of the Conspiracy of the Pizza; a Latin translation of Herodian; and a collection of Greek Epigrams; besides Latin odes and epigrams, and a Latin poem entitled Rusticus. He also contributed greatly to the correction and illustration of the Pandects.

Political Economy, the science of the social ordering of wealth, or the science which has as its aim the investigation of the social conditions regulating the production, distribution, exchange, and consumption of wealth, the term wealth being understood to mean all articles or products possessing value in exchange. While, however, political economy is susceptible of wide definition on these lines, the exact scope of the science within the terms of the definition has been the subject of much confused debate. From the nature of the actual conditions of the production and regulation of wealth, and the place of the systematic examination of these as departmental to a larger science investigating the natural laws of the formation and progress of civilized communities, it is impossible to sunder it entirely from physical, intellectual, and moral considerations tending to enlarge indefinitely its scope. The varying extent to which these elements have entered into the treatment of the subject by economists has given rise to controversy not only as to whether economics is to be considered as a physico-mental or a purely mental science, but even as to its claim to be considered an independent science at all. By most economists it is urged, that as the reasoned and systematic statement of a particular class of facts it may rightly claim to be considered a science, while, as dealing with inanimate things only incidentally as the measure of motives of desire, it is to be classed with the moral or social sciences. Of more importance, as affecting the whole history of the science, have been the questions arising from the method employed in economic inquiry. The modern English school of economists, including the names of Adam Smith, Ricardo, Mill, Cairns, Fawcett, and Marshall, have been mainly guided by the deductive method, its more extreme representatives, such as Senior, asserting this method to be the only one applicable to the science. In point of fact political economy has necessarily availed itself of both methods.

It has been deductive in so far as it has assumed at the outset certain hypotheses, and derived from these by a dialectical process the guiding principles of the science; but even the older economists, working under the immediate influence of the mathematico-physical sciences chiefly, cannot be justly accused of having overlooked, though they tended to underestimate, the necessity of supplementing deduction by induction. The hypothesis on which the economic system was founded, was that in the economic sphere the principal motive of human action was individual self-interest, leading men to seek to obtain the greatest amount of wealth with the least expenditure of effort; this hypothesis being followed out to its logical conclusions, under assumed conditions of perfectly free competition, in connection with the facts of the limitations of the earth's extent and productiveness, and the theory of a tendency in the race to multiply to an incalculable extent in the absence of natural or artificial obstacles. On this basis theories of value, rent, and population were formed, having the character of laws, but of laws which were hypothetical merely—true only under the assumed conditions of an environment in which competition was free and frictionless, unhampered by inertness, ignorance, restrictive customs, and the like. In this respect the method adopted and the results arrived at found analogy in those physical sciences the laws of which are only applicable in actual fact under large and variable modification. There was, however, an indisputable tendency among the earlier economic writers to regard these hypothetical laws as in a greater degree representative of actual fact than they were, and even, when the actual facts fell short of the theoretic conditions, to regard these as prescriptive and regulative. The ethical protest against this tendency found a strong support in the development of the group of biological sciences, opening up new conceptions of organic life and growth; and as the result of these and other influences the old rigidity in the application of theory has largely disappeared. Where the older economist tended to look upon the subject-matter of economics as more or less constant and furnishing laws of universal application, the modern economist, having regard to the complexity and variability of human motives and the development of the race both in the matter of character and institutions, has come to recognize that the abstract conception of a frictionless competitive atmosphere, in which self-interested motives worked with mechanical regularity, can never bear other than a qualified application to actual economic conditions, and that laws relating to the economic aspects of life at one stage of human development seldom apply at another without large modification. He realizes clearly what the older economists only imperfectly perceived, and even more imperfectly expressed, that the system they were elaborating was to be considered rather as an instrument to assist in the discovery of economic truth, than a body of truths representing any actual or desirable social state. When regarded in this light—as a means to assist in the disentanglement of the complex motives operative in actual economic relations—the isolation of one set of economic forces, and the tracing of the logical issues of these, becomes of the highest value, despite the danger in careless use of neglecting necessary modification and of translating its hypothetic statements into prescriptions for conduct and social organization. It has been this neglect, the assumption of didactic authority, and the extent of the modifications often necessary in the practical application of theory which have tended to bring the older school into discredit at the hands of Comte, Cliff Leslie, Ruskin, and a large number of foreign economists—some complaining with Comte of the tendency to vicious abstractions, and the impossibility of isolating to any useful end the special phenomena of economics from other social phenomena; some, like the German and American historic schools, arguing that it is desirable and necessary to reason direct from historic facts to facts without the intervention of any formal economic theory. So far, however, the opponents of the older method of dealing with economic problems, though they have accomplished an admirable work in clearing the older economics of many confusions and misapprehensions, have failed to supply a superior method of analysing the phenomena constituting the subject-matter of the science, while many of them have not scrupled to avail themselves largely of the results arrived at by the method they condemn. On the grounds of difference in method, and in conception of the scope of the science, the economists of to-day may be classified as forming four principal groups:—

1. The modern orthodox philosophic school,

working, as indicated above, on the basis of a body of hypothetical principles, constituting the statics of exchange and distribution, deductively arrived at by the consideration of the operations of motives of self-interest in an environment of free and frictionless competition—principles imperfectly representing actual economic conditions, but of assistance, under due precautions, in the accurate analysis of these.

2. A group of mathematical economists allied to the philosophic school as working on the deductive basis, and largely engaged in translating philosophic theory into symbolic formulæ for retranslation into theory.

3. The historical school, denying the value of deductive economics, and seeking to confine the work of the economist to the description of the various stages of economic civilization as they have arisen, and the indication, under due conditions of time, place, and national development, of such relative principles as may be discoverable in them.

4. A group of economic students who approach political economy from the point of view of a previous training in 'the sciences of inorganic and vital nature' (physics and biology as opposed to metaphysics), and who wish to include within the scope of economics the consideration of wealth as measured, not by subjective emotions and desires, but by the objective utility of things, the part played by them in the maintenance and evolution of society, the definitely determinable capacities they may possess of supplying physical energy and improving the physiological constitution of the race. From this point of view, economics is to be regarded as 'the direct study of the way in which society has actually addressed itself, and now addresses itself, to its own conservation and evolution through the supply of its material wants' (Ingram)—a study, therefore, inseparable from the study of sociology as a whole, and to be followed up under the immediate guidance or bias of a moral synthesis and a therapeutic aim.

The general scope of the science from the neo-orthodox standpoint may be broadly indicated under four heads:—

I. Production: dealing with the requisites of production—Land (natural agents), Labour, and Capital; the law of fertility of land (Law of Diminishing Returns); the laws of the growth of population and capital; the organization of industry, division of labour, &c.

II. The pure theory of values or theory of normal (natural) values, *i.e.* of values as they would arise in a market where competition was free and undisturbed. Under this head are discussed the relations of value and utility; the laws of supply and demand; cost and expenses of production; the law of rent and the relation of rent to value; the considerations determining the normal share of the various classes of producers in the value of the product; the laws of supply and demand in relation to skilled and unskilled labour and to capital; the laws of wages and earnings, &c.

III. The application of the pure theory of values under the conditions of actual trade—internal and international: treating of the medium of exchange; the influence of changes in the purchasing power of money; influence of modern credit systems; the influence upon prices and wages and profits of local customs, monopolies, combinations, trades-unions, co-operation, &c.; the conditions of foreign exchange; the competition of different countries in the same market, and the like.

IV. The economic functions and influence of government: dealing with Taxation, direct and indirect; the opposing principles of Protection and Laisser-faire, &c.

In the last division the treatment inevitably takes the form not merely of setting forth what is, but of discussing what ought to be; in other words, the method is no longer that of a science aiming at the systematized representation of facts, but rather that of an art, seeking to prescribe and regulate for ethical and prudential reasons the industry and commerce of nations. In this respect a large portion of the discussions usually ranged under this head might well be considered as forming with certain other pressing problems of economic reform a distinct branch of the subject, which may be provisionally described as prescriptive or regulative or therapeutic economics. To this branch would belong the various problems touching the fair share of the different productive classes in the value of the product, and indeed the investigation of the whole question of property in relation to the various schemes of distribution—individualistic, socialistic, and communistic. The frequent mixture of these considerations of practical economic reform with the non-moral and indifferent systematization of contemporary economic fact has been a most fertile source of confusion and misunderstanding.

As a separate scheme of knowledge meriting the title of a science, political economy is little more than a century old, but the germs of modern economic doctrines are to be traced long previous. In Greece, Plato, Xenophon, and Aristotle alike conduct investigations in economics from an ethical point of view and in subordination to the theory of the state, the last, however, showing a perception of the difference between value in use and value in exchange, of the advantages of division of labour, of the functions of money as a measure of value and an instrument of exchange, of the desirability of maintaining a proportion between population and territory. The Romans followed, without advancing upon, the economics of the Greeks. Cicero opposed manufactures and trade, upholding, in the main, like Cato and Varro, an agrarian ideal; Pliny condemned the effects of servile labour and the exportation of money, and discussed some of the problems connected with value. After the fall of Rome it is not till the latter part of the middle ages that we find the emancipation of the towns and the development of the burgher class admitting of industry and commerce on a wide scale. In the 13th century St. Thomas Aquinas paraphrased the doctrines of Aristotle on money and interest, establishing on them a condemnation of interest. His influence lasted into the next century, among the principal writers of which were Bartolo di Sassoferrato, Jean Buridan, and Nicolas Oresme, the latter the author of the fullest treatise on money written up till his time. Gabriel Biel, F. Patrizzii, and Diomede Caraffa are the chief names of the 15th century, the study of economics being chiefly pursued by ecclesiastics until the collapse of mediævalism in the 16th century. The main economic topics continued to be the nature and functions of money, the legitimacy of usury, institutions of credit, and monti di pietà. Chief among the 16th century writers are the names of Jean Bodin in France, and in England the writer W. S. (probably William Stafford), who worked in part from Bodin, Sir Walter Raleigh, Gilbert, Hackluyt, and Peckham. The characteristic doctrines developed at this time came to be known as the mercantile system, or Colbertism, and found expression in the close of the 16th and beginning of the 17th centuries chiefly in the writings of Antonio Serra in Italy, Antoine de Montchrétien in France, and Thomas Mun in England. They were opposed by a few early advocates of free-trade, including Emérique de Lacroix in France and Alberto Struzzi in Spain. In the second half of the 17th century considerable advances were made by Hobbes, Locke, Sir Joshua Child, Sir William Petty, and Sir Dudley North, and the foundation of the Bank of England gave rise to much controversy early in the 18th century, leading to more enlarged conceptions of the operations of credit. In France Boisguillebert and Vauban opposed Colbertism, and Montesquieu endeavoured to work out the economics of government finance. The foundation of the physiocratic school by Quesnay was, however, the chief economic movement of the 18th century in France, among its exponents being the elder Mirabeau, De la Rivière, Baudeau, Le Trosne, Dupont de Nemours, Gournay, and especially Turgot, the greatest of the group. It made some little way in Italy and Germany; but its direct influence was not marked in England, where Hume's Economic Essays were followed by Adam Smith's epoch-making Wealth of Nations, directed against mercantilists and physiocrats alike. New elements were introduced by the population theory of Malthus, and the theory of rent enunciated by Ricardo on the lines indicated by Anderson and West; and the statistical side was developed by Thomas Tooke. In reducing the teaching of Adam Smith to system, the French economist Say played an influential part, and the work was advanced still further by the labours of Torrens, James Mill, M'Culloch, Whately, Senior, and other minor writers. No work, however, after the Wealth of Nations exercised so wide an influence as that of John Stuart Mill, who despite the signs of revolt, to which allusion has been made, still dominates popular economic thought for good and ill. The names of Longe, Leslie, Thornton, and Cairnes may be noted among the earlier critics or commentators of Mill; while Marshall, working on the basis of Mill, has more accurately defined the limitations of the deductive method in seeking to formulate and apply a pure theory of values. Among other recent writers of importance have been W. Stanley Jevons (mathematical and statistical group), Carl Marx (Socialist), Roscher (historical), Sidgwick (eclectic), and Ingram (Positivist).

Political Offences are those offences considered injurious to the safety of the state, or such crimes as form a violation of the

allegiance due by a subject to the recognized supreme authority of his country. In modern times the crimes considered political offences have varied at different periods and in different states. In Britain the most serious political offences are termed treason (see *Treason* and *Treason-Felony*), and those of a lighter nature, which do not aim at direct and open violence against the laws or the sovereign, but which excite a turbulent and discontented spirit which would likely produce violence, are termed sedition. (See *Sedition.*) Political offenders of foreign countries are by English law not included in extradition treaties. In the United States also, and in most of the countries of Europe, the extradition treaties do not include the giving up of political offenders.

Political Parties, divisions of people in a state marked off by the particular views they hold as to the public policy to be pursued in the best interests of the people at large. In the normal condition of British politics there were but two political parties, the *Liberal* and the *Conservatives* or *Tories.* The former were distinctively advocates of progressive reform, and were sub-classed as *Whigs* or *Radicals*, according as their views were moderate or advanced. The Irish question has for the present created two other parties by a division on different lines, *Home-Rulers* and *Unionists.* The Unionists comprise the whole of the Conservative party and a considerable portion of the Liberal side; the Home-Rulers, the dissatisfied Irish and their sympathizers among the Liberals. In America the chief political parties are the *Democrats* and the *Republicans*, the former favouring a tariff for revenue purposes only; the latter a high protective tariff. French political parties are broadly divided into *Republicans* and *Reactionaries*, both of which are subdivided into numerous antagonistic sections, the latter including *Bonapartists* and *Monarchists*, or those who favour a restoration of the old monarchy. In German politics there are the *Ultramontanes*, the *Conservatives*, the *Reichspartei* or *Imperialists*, the *National Liberals*, the *Progressists*, the *Social Democrats*, the *Volkspartei* or *Democrats*, &c.

Politics, in its widest extent, is both the science and the art of government, or the science whose subject is the regulation of man in all his relations as the member of a state, and the application of this science. In other words it is the theory and the practice of obtaining the ends of civil society as perfectly as possible. In common parlance we understand by the politics of a country the course of its government, more particularly as respects its relations with foreign nations.

Poliziano. See *Politian.*

Polk (pōk), James Knox, president of the United States of North America from 1845–49, was born in 1795 in North Carolina; died at Nashville 1849. He studied law and entered Congress as representative of Tennessee in 1825. He was speaker of the House of Representatives from 1835 to 1839. His advocacy of the annexation of Texas led to his election as president in 1844. The annexation of Texas, the Mexican war, the acquisition of Upper California and New Mexico, and the settlement of the Oregon boundary were the chief events of his term of office.

Polka, a species of dance of Bohemian origin, but now universally popular, the music to which is in $\frac{2}{4}$ time, with the third quaver accented. There are three steps in each bar, the fourth beat being always a rest.

Pollack (*Merlangus pollachius*), a fish of the cod family. The pollack belongs to the same genus as the whiting (*M. vulgāris*); the members of this genus possessing three dorsal fins and two anals. The lower jaw is

Pollack (*Merlangus pollachius*).

longer than the upper jaw, and the tail is forked, but not very deeply. It inhabits the Atlantic Ocean, and is common on all the British coasts, as well as on the shores of Norway. The northern coasts of Britain appear to be those on which these fishes are most abundant. The pollacks are gregarious in habits, and swim in shoals. It bites keenly at either bait or fly, and affords good eating. Called in Scotland *Lythe.*

Pollan, the 'fresh-water herring' (*Coregŏnus Pollan*), a species of fishes belonging to the Salmonidæ. It is an Irish species, and is found in Lough Erne, Lough Neagh, and Lough Derg. It is generally about 9 or 10 inches in length. There is a Scotch species in Loch Lomond known as the *Powan*; another in Lochmaben, the *Vendace.*

Pollanarrua, a ruined city and formerly capital of Ceylon, situated about 60 miles N.E. of Candy. There are numerous large stone figures of Buddha, and remains of temples and other buildings. It flourished from the 8th to the beginning of the 13th century. Called also Topare.

Pollard, the name given to a tree the head of which has been lopped off about 8 or 10 feet from the ground, in order to induce it to send out bushy shoots, which are cut periodically for basket-making, fuel, fencing, or other purposes.

Pollen, the male element in flowering plants; the fine dust or powder which by contact with the stigma effects the fecundation of the seeds. To the naked eye it appears to be a very fine powder, and is usually inclosed in the cells of the anther; but when examined with the microscope it is found to consist of hollow cases, usually spheroidal, filled with a fluid in which are suspended drops of oil from the 20,000th to the 30,000th of an inch in diameter, and grains of starch five or six times as large. Impregnation is brought about by means of tubes (pollen-tubes) which issue from the pollen-grains adhering to the stigma, and penetrate through the tissues until they reach the ovary. The cut shows the pollen-grains of (1) manna-ash (*Fraxinus ornus*), (2) clove (*Caryophyllus aromaticus*), (3) strong-scented lettuce (*Lactūca virōsa*).

Pollen Grains (magnified).

Pollenza (pol-yen'thà), a town of Spain, in the island of Majorca, 28 miles north-east of Palma. It has a fine Jesuits' college, partly ruinous; and manufactures of linen and woollen cloth. Pop. 8547.

Pollio, Caius Asinius, a Roman of plebeian family, born B.C. 76, died A.D. 4. He took a prominent part in the civil war, and accompanied Julius Cæsar to Pharsalia, and then to the African and Spanish wars. After obtaining the consulship he commanded in Illyria and Dalmatia, and for his victories was honoured with a triumph B.C. 39. He afterwards devoted most of his time to literary pursuits, but acted both as a senator and an advocate. His works, consisting of speeches, tragedies, and a history of the civil war in seventeen books, have all been lost. He was the friend of Virgil and Horace, and founded the first public library in Rome.

Pollok, Robert, a Scottish poet, was born at Muirhouse, in the parish of Eaglesham, Renfrewshire, 1799, died at Southampton 1827. He was educated at Glasgow University, studied divinity, and was licensed as a preacher by the Associate Presbytery of Edinburgh in the spring of 1827. He is the author of a series of Tales of the Covenanters, and a blank verse poem, The Course of Time, which in spite of many faults has enjoyed a wonderful popularity both in Britain and America. He died of pulmonary disease soon after the publication of his poem.

Pollokshaws', a town of Scotland, county of Renfrew, a little to the south-west of Glasgow, on the White Cart. The inhabitants are principally employed in the manufacture of cotton fabrics, iron-founding, engineering, paper-making, &c. Pop. 9363.

Poll-tax, a tax levied per head in proportion to the rank or fortune of the individual; a capitation tax. This tax was first levied in England in 1377 and 1380, to defray the expenses of the French war, its collection in 1381 led to the insurrection of Wat Tyler. In the United States a poll-tax (varying from 25 cts. to $3 annually) is levied in 24 States, in addition to the taxes on property.

Pollux. See *Castor and Pollux.*

Pollux, Julius, a Greek sophist and grammarian, born at Naucratis, Egypt, about the year 135 A.D. He went to Rome during the reign of Marcus Aurelius, who appointed him one of the preceptors of his son Commodus. He wrote several works, all of which have perished except his Onomasticon, dedicated to Commodus, and therefore published before 177. This work is of great value in the study of Greek antiquity.

Polo, a game at ball resembling hockey. The players are mounted on ponies, and wield a 'mallet' 4 feet 4 inches in length (a stick with a crook at the end). It is played by sides, and the object is to drive the ball from the centre of the ground through either of the goals, the side gaining the most goals being the winner.

Polo, Gaspar Gil, a Spanish poet, born at Valencia about 1517, died 1572. His reputation was established by his Diana Enamorada, a pastoral romance, partly in prose and partly in verse. Cervantes excepts the Diana of Polo from his list (in Don Quixote) of works condemned to be burned. It has been translated into French, English, and Latin.

Polo, MARCO, Venetian traveller, was born about the year 1256. His father Nicolo was the son of Andrea Polo, a patrician of Venice. Shortly before Marco's birth, Nicolo with his brother Matteo set out on a mercantile expedition, and ultimately arrived at Kemenfu, on the frontiers of China, where they were favourably received by Kubilai, the grand-khan of the Mongols. In 1266 the khan sent the brothers on a mission to the pope, and they arrived in Venice in 1269. Two years later they again set out for the East, this time accompanied by the young Marco. After reaching the court of Kubilai, Marco rapidly learned the language and customs of the Mongols, and became a favourite with the khan, who employed him on various missions to the neighbouring princes. Soon afterwards he was made governor of Yang-tchou, in Eastern China, an appointment he held for three years. In 1292 the three Polos accompanied an escort of a Mongolian princess to Persia. After arriving at Teheran they heard of Kubilai's death, and resolved to return home. They reached Venice in 1295. In the following year Marco Polo took part in the naval battle of Curzola, in which he was taken prisoner. During his captivity he dictated to a fellow-prisoner, Rustichello or Rusticiano of Pisa, an account of all his travels, which was finished in 1298. After his liberation he returned to Venice, where he died in 1323. His book—known as the Book of Marco Polo—created an immense sensation among the scholars of his time, and was regarded by many as pure fiction. It made known to Europeans the existence of many nations of which they were formerly totally ignorant, and created a passion for voyages of discovery. It has gone through numerous editions in the various European languages, but the best is that of Col. (Sir Henry) Yule, accompanied with a great amount of learned elucidation and illustration. It was originally written in French, but Latin and Italian MSS. of it are more common.

Polonaise (Italian, *Polacca*), is a Polish national dance, which has been imitated, but with much variation, by other nations. The *Polonaise*, in music, is a movement of three crotchets in a bar, characterized by a seeming irregularity of rhythm, produced by the syncopation of the last note in a bar with the first note of the bar following, in the upper part or melody, while the normal time is preserved in the bass.

Po'lotzk, a town in Russia, government of Vitebsk, at the confluence of the Polotka and the Dwina. The most remarkable edifices are a dilapidated castle built by Stephen Bathory, king of Poland, in the 16th century, and the old Jesuit convent and college. It has an increasing trade, especially with Riga, in corn, flax, linseed, &c., and tanning is carried on to some extent. A battle took place here between the Russians and the French in 1812, in which the latter were defeated. Pop. 19,074.

Polta'va, or PULTAWA, a government of Russia, bounded by Czernigov, Kharkov, Ekaterinoslav, Kherson, and Kiev; area, 19,265 sq. miles. It consists of an extensive and somewhat monotonous flat, watered by several tributaries of the Dnieper. It is one of the most fertile and best cultivated portions of the Russian Empire, and grows large quantities of grain. Live stock and bee rearing are important branches of the rural economy. Both manufactures and trade are of very limited extent. Education is very neglected. Pop. 2,520,887.—POLTAVA, the capital, at the confluence of the Poltava with the Worskla, has straight and broad streets, a cathedral, important educational institutions, &c. As a place of trade Poltava derives importance from the great fair held on 20th July each year. Wool is the great staple of trade. Horses, cattle, and sheep are likewise bought and sold in great numbers. It contains a monument to Peter the Great, who here defeated Charles XII. in 1709. Pop. 41,250.

Polyadel'phia, the name given by Linnæus to the eighteenth class of his sexual system, in allusion to the stamens being collected into several parcels.

Polyan'dria, or POLYANDRY (Greek *polys*, many, and *anêr*, *andros*, a man), denotes the custom of one woman having several husbands (generally brothers) at one time. This system prevailed among the Celts of Britain in Cæsar's time, and occurs yet in Southern India, in Tibet, among the Eskimo, the Aleutians, some tribes of American Indians, and in the South Seas. The practice is believed to have had its origin in unfertile regions in an endeavour to check the undue pressure of population on the means of subsistence.

Polyandria, in botany, the name given by Linnæus to a class of hermaphrodite plants having many stamens, or more than twenty, arising immediately from below the ovary.

Polyanthus, a beautiful and favourite variety of the common primrose (*Primŭla vulgāris*), a native of most parts of Europe, growing in woods and copses in a moist clayey soil. The leaves are obovate, oblong, toothed, rugose, and villous beneath. The flowers are in umbels on a scape or flower-stalk 3 to 6 inches or more in length. In addition to propagating from seeds polyanthuses may also be readily increased by division. The seeds should be sown in June. The plants should be potted in August. Some will show flowers the same autumn, and many in the following spring. The plants are very hardy, and require to be transplanted every two years.

Garden Polyanthus.

Polybasic Acids, acids which possess more than one hydrogen atom capable of being replaced by a metal equivalent.

Polyb'ius, a Greek historian, was born at Megalopolis, in Arcadia, about 204 B.C., died 122. His father, Lycortas, was one of the leaders of the Achæan League, and the confidential friend of Philopœmen. Educated for arms and political life he entered, at the age of twenty-four years, into the military and political service of the League. After the subjugation of Perseus, king of Macedonia, by the Romans (168), Polybius found himself among the 1000 Achæans summoned to Rome to answer before the senate why the League had not aided the Roman army in Macedonia. While in Italy he formed an intimate friendship with Scipio Æmilianus, whom he accompanied on his African campaign, and witnessed the destruction of Carthage. He returned to Greece in 146, just after the fall of Corinth, and exerted himself successfully to obtain moderate terms from the Romans for his countrymen. His principal work is his history of Rome, in forty books, from 220 to 140 B.C., with an introduction giving a sketch of the rise of the city from its conquest by the Gauls to the outbreak of the second Punic war. Only the first five books and fragments of the rest are extant.

Pol'ycarp, one of the Christian fathers, and, according to tradition, a disciple of the apostle John, was born probably in Smyrna about 69 or 70; martyred 155 or 156. According to a legendary fragment ascribed to a writer named Pionius, he was consecrated bishop of his native city by St. John. During the persecution under Marcus Aurelius, Polycarp was seized and brought before the Roman proconsul at Smyrna. Having refused to renounce his faith he was condemned to the flames. He wrote several letters, which were current in the early church, but have all perished except one addressed to the Philippians, which appears to have been written about 115, and is valuable for its quotations from the apostolic writings.

Polychrome Printing. See *Colour Printing.*

Pol'ychromy, the name given to the art of decorating works of sculpture and architecture with different colours. The custom of painting statues is as ancient as sculpture itself; the Egyptians, Assyrians, Phœnicians, Babylonians, and Persians all painted their statues in various colours, especially in red. Polychromy, however, only reached the dignity of a real art among the Greeks. Instead of employing colours, the sculptors of the age of Pericles generally used marbles of different colours fitted together, and the ornaments of their statues were made of various metals and of ivory. Thus the nude parts were, in some cases, of Parian marble, the draperies of streaked onyx, the eyes of gold or ivory, the shields and other arms of bronze, and so forth. Architectural polychromy may be divided into natural polychromy, in which the materials employed produce certain effects by their natural colours; and artificial polychromy, which is simply the application of coats of paint, whether on the exterior or interior parts of the edifice. Both natural and artificial polychromy were used by the Egyptians, Assyrians, Babylonians, and Persians. Polychromy was cultivated by the Romans in a much more restricted style. In the public buildings of the later Romans gold decorations and facings of variegated stone were used instead of mere colours. In the middle ages polychrome architecture was adopted by the Arabs and Byzantines. A fine example of Byzantine architecture in polychrome style is the Palatine Chapel at Palermo, erected in 1232. On the establishment of Gothic architecture polychromy was introduced into the interior of churches.

This practice was maintained throughout the middle ages.

Polycle'tus OF SICYON, a Greek sculptor and architect, who flourished about 452–412 B.C. His most celebrated statues were the Doryphorus (Spear-bearer), to which the name of *canon* or model was given; and his statue of Hera (Juno) in the temple between Argos and Mycenæ. As an architect he also distinguished himself.

Polycotyle'donous Plants, those plants of which the embryos have more than two cotyledons or seed-lobes. Instances occur in plants of the cruciferous order, and in coniferous plants.

Polyc'ratēs, Greek tyrant or absolute ruler of Samos during the time of the elder Cyrus. He made himself master of the island by violence, and having secured absolute sway seized upon several of the neighbouring islands and some towns upon the mainland. In 522 B.C. the Persian satrap Oroetes treacherously invited Polycrates to his palace, and there crucified him. Polycrates seems to have had much taste for learning and the arts, and greatly promoted the refinement of the Samians.

Polycysti'na, a group of Protozoa, division Rhizopoda, order Radiolaria, consisting of minute organisms allied to the Foraminifera, but their shells are of siliceous matter, while those of the latter are calcareous. The bodies of the Polycystina are composed of a brownish sarcode-matter apparently containing yellow globules, which protrudes in the form of elongated filaments (*pseudopodia*) through apertures in the shells. The Polycystina inhabit the sea-depths, and are abundantly represented as fossil organisms, as in the 'infusorial earth' of Barbadoes.

Polydeucēs, or POLYDEUKĒS, the Greek name of Pollux. See *Castor and Pollux*.

Polydipsia, a term applied to diabetes.

Polyem'bryony, in botany, a phenomenon occurring, sometimes regularly and sometimes abnormally, in the development of the ovules of flowering plants, consisting in the existence of two or more embryos in the same seed.

Polyg'ala, a genus of plants of the natural order Polygalaceæ. The species abound in milky juice, and are found in most parts of the world. The root of *P. Senĕga* (senega or seneca root or Virginian snake-root) is a stimulating diuretic, useful in pneumonia, asthma, and rheumatism. *P. vulgāris*, the common milkwort, is a beautiful plant, found in dry pastures.

Polygala'ceæ, a natural order of herbs or shrubs, with alternate, exstipulate, simple leaves; irregular hermaphrodite flowers; diadelphous or monadelphous stamens; anthers opening at the apex by a pore or chink. Nearly half the species are comprised in the genus *Polygala*, and are very generally distributed. The plants of this order are mostly bitter, and acrid or astringent.

Polyg'amy consists in a man's having more than one wife at the same time. In ancient times polygamy was practised by all the Eastern nations, and was sanctioned or at least tolerated by their religions. It was permitted to some extent among the Greeks, but entirely disappeared with the later development of Greek civilization. To the ancient Romans and Germanic races it was unknown. It prevailed among the Jewish patriarchs both before and under the Mosaic law. But in the New Testament we meet with no trace of it. Polygamy has never been tolerated among Christians, although the New Testament contains no injunction against it. It is, however, practised by the Mohammedans and Mormons. A statute of Edward I. treated polygamy as a capital crime. See *Mormons*.

Pol'yglot (Greek, *polys*, many, and *glōtta*, language), a work which contains the same matter in several languages. It is more particularly used to denote a copy of the Holy Scriptures in which two, three, or more translations are given, with or without the original. The first great work of the sort is the Complutensian polyglot, prepared under the direction of Cardinal Ximenes, and splendidly printed (1514–17), in 6 folio volumes, at Alcala de Henares, called in Latin *Complutum*, whence the name of the work. It contains the Hebrew text of the Old Testament, with the Vulgate, the Septuagint, a literal Latin translation, and a Chaldee paraphrase (which is also accompanied by a Latin translation). Another celebrated polyglot is that of Antwerp, called the *Royal Bible*, because Philip II. of Spain bore part of the cost of publication. It was conducted by the learned Spanish theologian Benedict Arias Montanus, assisted by other scholars. It appeared at Antwerp in 8 folio volumes (1569–72). The Paris polyglot appeared in 1645, in 10 folio volumes. The London or Walton's polyglot, in ten languages, appeared in 6 volumes folio, with two supplementary volumes (London, 1654–57). It was conducted under the care of Bryan Walton, afterwards Bishop of Chester, and

contains all that is in the Paris polyglot, but with many additions and improvements. It contains the original text according to several copies, with an Ethiopic and a Persian translation, and the Latin versions of each. Bagster's Polyglot (folio, London, 1831) gives eight versions of the Old Testament and nine of the new.

Polygno'tus, Greek painter, flourished from 450 to 410 B.C. He was a native of the Island of Thasos, and was instructed in his art by his father Aglaophon. Cimon, the rival of Pericles, brought him to Athens and employed him to decorate the Stoa Pœcilē, or painted portico at Athens. His works were probably on wood. Polygnotus is represented as being the first who made painting independent of sculpture.

Pol'ygon (Greek, *polys*, many, *gōnia*, an angle). In geometry, a plane figure of many angles and sides, or at least of more than four sides. A polygon of five sides is termed a *pentagon;* one of six sides, a *hexagon;* one of seven sides, a *heptagon*, and so on. *Similar polygons* are those which have their several angles equal each to each, and the sides about their equal angles proportionals. All similar polygons are to one another as the squares of their homologous sides. If the sides, and consequently the angles, are all equal, the polygon is said to be regular; otherwise, it is irregular. Every regular polygon can be circumscribed by a circle, or have a circle inscribed in it.—*Polygon of forces*, in mechanics, the name given to a theorem which is as follows:—If any number of forces act on a point, and a polygon be taken, one of the sides of which is formed by the line representing one of the forces, and the following sides in succession by lines representing the other forces in magnitude, and parallel to their directions, then the line which completes the polygon will represent the resultant of all the forces.

Polygona'ceæ, a natural order of herbaceous plants, with trigonal fruit, and usually with stipules united into a tube or ochrea, through which the stem passes. They have astringent and acid properties; some are purgative, and a few are acrid. Among the best-known species are rhubarb, the docks, and the sorrels. See *Polygonum.*

Polyg'onum, a genus of herbaceous plants, natural order Polygonaceæ. They are found in the temperate regions of Europe, Africa, North America, and Asia. They are herbaceous, rarely shrubby plants, with alternate stipulate or exstipulate leaves, and spikes of small pink flowers. Several British species are known by the name of persicarias. See *Bistort, Buckwheat, Knot-grass.*

Polygyn'ia, one of the orders in the fifth, sixth, twelfth, and thirteenth classes of the Linnæan system, comprehending those plants which have flowers with many pistils, or in which the pistils or styles are more than twelve in number.

Polyhe'dron, in geometry, a body or solid bounded by many faces or planes. When all the faces are regular polygons similar and equal to each other the solid becomes a regular body. Only five regular solids can exist, namely, the tetrahedron, the hexahedron, the octahedron, the dodecahedron, and the icosahedron.

Polyhym'nia, or **Polym'nia**, among the Greeks, the muse of the sublime hymn, and according to some of the poets, inventress of the lyre, and of mimes. She is usually represented in art as covered with a white mantle, in a meditative attitude, and without any attribute.

Polym'erism is a particular instance of isomerism (which see). *Polymerization* is a name given to the process by which a chemical compound is transformed into another having the same chemical elements combined in the same proportions but with different molecular weights: thus the hydrocarbon amylene, C_5H_{10}, when acted on by strong sulphuric acid, is converted into the polymer paramylene, $C_{10}H_{20}$.

Polymor'phism, the property possessed by certain bodies of crystallizing in two or more forms not derivable one from the other. Thus mercuric iodide separates from a solution in tables belonging to the dimetric system; if these crystals are heated they sublime and condense in forms belonging to the monoclinic system; carbonate of calcium exists as calc-spar, which crystallizes in rhombohedral forms, and as aragonite, which crystallizes in trimetric forms.

Polynemus. See *Mango-fish.*

Polyne'sia (Greek, *polys*, many, *nēsos*, island), a general name for a number of distinct archipelagoes of small islands scattered over the Pacific Ocean, extending from about lat. 35° N. to 35° S., and from lon. 135° E. to 100° W., the Philippines, New Guinea, Australia, and New Zealand being excluded. (See *Oceania.*) The islands are distributed into numerous groups, having a general direction from N.W. to S.E. The groups north of the equator are the Pelew, Ladrone or Marianne, Caroline, Marshall, Gil-

bert or Kingsmill, Fanning, and Hawaii or the Sandwich Islands. South of the equator are New Ireland, New Britain, Solomon Islands, New Hebrides, Fiji, New Caledonia, Navigator, Friendly, Cook's or Harvey, and the Society Islands, the Low Archipelago, the Marquesas Islands, and the isolated Easter Island. The term Polynesia is sometimes restricted to the groups most centrally situated in the Pacific; the New Hebrides, Solomon Islands, New Britain, New Ireland (Bismarck Archipelago), &c., being classed together as Melanesia, whereas the Carolines, Ladrones, Marshall Islands, &c., form Micronesia. The islands may be divided into two chief classes, volcanic and coral islands. Some of the former rise to a great height, the highest peak in the Pacific, Mauna Kea, in Hawaii, reaching 13,895 feet. The principal groups of these are the Friendly, the Sandwich, the Marquesas, and the Navigator Islands. The coral islands comprise the Carolines, Gilbert, and Marshall Islands on the north-west, and the Society Islands and Low Archipelago in the south-east, in both of which groups the *atoll* formation is very common, besides numerous other groups where coal reefs occur. The elevations of these groups do not exceed 500 feet. Polynesia has a comparatively moderate temperature, and the climate is delightful and salubrious. The predominating race, occupying the central and eastern portion of Polynesia, is of Malay origin, with oval faces, wide nostrils, and large ears. The hair and complexion vary greatly, but the latter is often a light brown. Their language is split up into numerous dialects. The other leading race is of negroid or Papuan origin, with negro-like features and crisp mop-like hair. They are confined to Western Polynesia, and speak a different language, with numerous distinct dialects. Christianity has been introduced into a great many of the islands, and a large number of them are under the control of one or other of the European powers. Many atrocities have been practised on the natives in recent times in connection with the luring or kidnapping of them to work in the European settlements. The commercial products consist chiefly of cocoa-nuts, cotton, coffee, sugar, fruits, pearls, and trepang. The Ladrones were discovered by Magellan in 1521, the Marquesas by Mendaña in 1595, but it was not until 1767 that Wallis, and subsequently Cook, explored and described the chief islands. Since the natives came in contact with the whites their numbers have greatly decreased. For further information see articles on the individual groups and islands.

Polyni'ces. See *Eteocles.*

Polyp, a term which has been very variously and indiscriminately applied to different animals. It has thus been used to designate any animal of low organization, such as the sea-anemones, corals, and their allies; or it has been employed to indicate animals, which, like the cœlenterate zoophytes or Hydrozoa, and the molluscoid Polyzoa, bear a close resemblance to plants. It is now generally applied to any single member of the class Actinozoa, represented by the sea-anemones, corals, and the like; or any member (or zoöid) of a compound organism belonging to that class. The term *polypide* is employed to designate each member or zoöid of the compound forms included in the Polyzoa. The name *polypidom* applies to the entire outer framework or skin-system of a compound form such as a hydrozoan zoophyte. The word *polypite* refers to each separate zoöid or member of a compound zoophyte or hydrozoön. The *polypary* of a hydrozoön specially refers to the horny or chitinous skin secreted by the Hydrozoa.

Polyphe'mus, in Greek mythology, the most famous of the Cyclops, who is described as a cannibal giant with one eye in his forehead, living alone in a cave of Mount Ætna and feeding his flocks on that mountain. Ulysses and his companions having been driven upon the shore by a storm, unwarily took refuge in his cave. Polyphemus, when he returned home at night, shut up the mouth of the cavern with a large stone, and by the next morning had eaten four of the strangers, after which he drove out his flocks to pasture, and shut in the unhappy captives. Ulysses then contrived a plan for their escape. He intoxicated the monster with wine, and as soon as he fell asleep bored out his one eye with the blazing end of a stake. He then tied himself and his companions under the bellies of the sheep, in which manner they passed safely out in the morning. Polyphemus was the despised lover of the nymph Galatea.

Polyphon'ic, a term applied to a musical composition in two or more parts, each of which forms an independent theme, progressing simultaneously according to the laws of counterpoint, as in a fugue, which is the best example of compositions of the polyphonic class.

Polypodia'ceæ, a natural order of ferns, which may be taken as the type of the whole. They constitute the highest order of acrogenous or cryptogamic vegetation, and are regarded as approaching more nearly to cycadaceous gymnosperms than to any other group of the vegetable kingdom. They are usually herbaceous plants with a permanent stem, which either remains buried or rooted beneath the soil, or creeps over the stems of trees, or forms a scarcely movable point of growth, round which new leaves are annually produced in a circle, or it rises into the air in the form of a simple stem, bearing a tuft of leaves at its apex and sometimes attaining the height of 40 feet, as in the tree-ferns.

Polyp'orus, a genus of parasitical fungi. The *P. destructor* is one of the pests of wooden constructions, producing what is sometimes termed *dry-rot*, although the true dry-rot is a different plant (*Merulius lacrymans*). *P. igniarius* is known by the name of amadou, touch-wood, or spunk.

Polyp'terus, a genus of fishes inhabiting the Nile, Senegal, and other rivers of Africa, and included in the Ganoid order of the class. They form types of a special family, the Polypteridæ. Their most singular characteristic is the structure of the dorsal fin, which instead of being continuous is separated into twelve or sixteen strong spines distributed along the back, each bordered behind by a small soft fin. In the young there is an external gill. The *Polypterus bichir* attains to a length of 4 feet.

Polypus, in medicine, a name given to tumours chiefly found in the mucous membranes of the nostrils, throat, ear, and uterus; rarely in the stomach, bladder, and intestines. Polypi differ much in size, number, mode of adhesion, and nature. One species is the *mucous*, *soft*, or *vesicular*, because its substance consists of mucous membrane with its embedded glands; another is called the *hard* polypus, and consists of fibrous tissue. Polypi may be malignant in character, that is, of the cancerous type.

Polysyn'deton is the name given to a figure of speech by which the conjunctive particles of sentences are accumulated, contrary to usual custom, for the purpose of giving a greater emphasis to the terms connected by them, as when Schiller says, 'And it waves, and boils, and roars, and hisses.'

Polysynthetic Languages. See *Philology.*

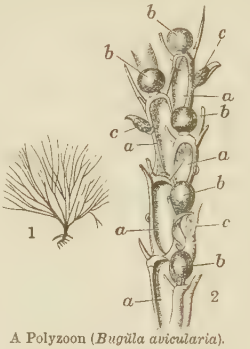
Polytechnic School. See *Ecole Polytechnique.*

Polythala'mia, a group of Protozoa occupying compound chambered cells of microscopic size. In some instances each cell of the common shell presents only one external opening, but more commonly it is punctured with numerous minute pores or foramina, through which the animal can protrude filaments. Their remains constitute the bulk of the chalk and tertiary limestone. See *Foraminifera.*

Polythe'ism (Greek, *polys*, many, *theos*, god), the belief in, and worship of, a plurality of gods; opposed to monotheism, the belief in, and worship of one god. It is still a matter of debate whether polytheism is a primary form of human belief, or a degeneration of an original monotheistic idea. It is argued, on the one hand, that the sense of personal dependence, the feeling that there was an undefined power, a mysterious *something* around and above him, did not primarily present itself to the mind of man except under a form of unity. His earliest religion would therefore be of a monotheistic character, but of a highly unstable nature, and eminently liable, amongst races of rude faculties and little power of abstraction, to assume a polytheistic form, the idea of one Supreme Being being readily obscured by the multiplicity of the visible operations of that being on earth. Those who affirm that polytheism was a primary form of religious belief argue that man, ignorant of the nature of his own life, and of the nature, origin, and properties of other objects, could at first only attribute vaguely to all visible things the same kind of conscious existence as that which belonged to himself. Thus the sun, moon, and stars would all be living beings; and their influence, from the absence of any idea of a natural order, would be seen in the working of the material world, and in all the accidents of human life. As being beyond human control, and as affecting the condition of men, they would be loved or feared; and with the growth of the idea that they might be propitiated or appeased the system of polytheism would be complete. See *Monotheism* and *Mythology.*

Polyzo'a (Gr. *polys*, many, *zōon*, animal), a class of Molluscoida or Lower Mollusca, generally known by the popular names of 'sea-mosses' and 'sea-mats.' They are invariably compound, forming associated growths or colonies of animals produced by gemmation from a single primordial individual, and inhabit a *polyzoarium*, or aggregate of cells, corresponding to the

polypidom of the composite hydroids. The polypide, or individual polyzoon, resides in a separate cell or chamber, has a distinct alimentary canal suspended freely in a body cavity, and the reproductive organs contained within the body. The body is inclosed in a double-walled sac, the outer layer (*ectocyst*) of which is chitinous or calcareous, and the inner (*endocyst*) a delicate membranous layer. On the ectocyst are seen certain peculiar processes called 'bird's-head processes,' or *avicularia*, from their shape, the use of which is unknown. The mouth-opening at the upper part of each cell is surrounded by a circlet of hollow ciliated tentacles, which perform the function of respiration, and are supported on the *lophophore;* and the cell may be closed by a sort of valve called the *epistome*. All the Polyzoa are hermaphrodite. In many cases there are *ovicells* or sacs into which the fertilized ova pass. From these proceed free-swimming ciliated embryos which develop into polypides. Continuous gemmation exists in all. The Polyzoa are classed into three groups: Ectoprocta, Entoprocta, and Aspidophora. The Ectoprocta are divided into two orders of *Phylactolæmata*, with a crescentic lophophore and an epistome; and *Gymnolæmata*, or Infundibulata, with a circular lophophore and no epistome. They are all aquatic in their habits; the marine Polyzoa being common to all seas, but the fresh-water genera are mostly confined to the north temperate zone.



A Polyzoon (*Bugula avicularia*).

1, Natural size. 2, Portion of same magnified. *a*, Cells. *b*, Ovicells. *c*, Avicularia.

Poma'ceæ, or **Po'meæ**, a division of the natural order Rosaceæ, to which the apple, pear, quince, and medlar belong. It differs from Rosaceæ proper in having an inferior ovary. The fruit is always a *pome*, with a crustaceous core or bony stones.

Pombal (pon'bal), Sebastião José Carvalho, Marquis of, Portuguese statesman, born in 1699, died in 1782. After studying law at Coimbra, Pombal served for some time in the army. In 1739 he was appointed ambassador in London. He was recalled in 1745, and the queen sent him to Vienna to act as mediator between the pope and Maria Theresa. Under Joseph I. he became secretary of state for foreign affairs. He soon rendered the king entirely subject to his influence, and proceeded to the accomplishment of his favourite objects—the expulsion of the Jesuits, the humiliation of the greater nobles, the restoration of Portugal's prosperity, and the absolute command of the state in the name of the monarch. He deprived the leading nobles of their princely possessions in the colonies, and abridged the powers of the prelacy. In 1757 he deprived the Jesuits of the place of confessors and ordered them to retire to their colleges. A conspiracy against the life of the king afforded him opportunity to banish the whole order of Jesuits from the kingdom in 1759. Pombal reorganized the army, and was active in his efforts to improve the country in every relation; he paid particular attention to education. Joseph I. died in 1777, and was succeeded by his daughter Maria I., who immediately deprived Pombal of his offices.

Pomegranate (pom'gra-nāt; *Punica granātum*, order Myrtaceæ), a dense spiny shrub, from 8 to 20 feet high, supposed to have belonged originally to the north of Africa,

Pomegranate (*Punica granatum*).

and subsequently introduced into Italy. It was called by the Romans *malum Punicum*, or Carthaginian apple. The leaves are opposite, lanceolate, entire, and smooth; the flowers are large and of a brilliant red; the

fruit is as large as an orange, having a hard rind filled with a soft pulp and numerous red seeds. The pulp is more or less acid and slightly astringent. The pomegranate is extensively cultivated throughout Southern Europe, and sometimes attains a great size. Another species (*P. nana*) inhabits the West Indies and Guiana.

Pomera'nia (German, *Pommern*), a province of Prussia, bounded by the Baltic, Mecklenburg, Brandenburg, and West Prussia; area, 11,622 square miles. The coast is low and sandy and lined by numerous lagoons. The chief islands along the coast are Rügen, Usedom, and Wollin. The interior is flat and, in parts, marshy. The principal rivers are the Oder, Persante, and Stolpe. The soil is generally sandy and indifferent, but there are some rich alluvial tracts, producing a quantity of grain. Flax, hemp, and tobacco are also cultivated. Domestic animals are numerous. The forests are of large extent. Fish is abundant. There are few minerals. Manufactures include woollen and other fabrics. A considerable general and transit trade is carried on. The centre of trade is Stettin, which ranks as one of the chief commercial cities of Prussia. Pomerania appears to have been originally inhabited by Goths, Vandals, and Slaves. The first mention of it in history is in 1140. It long remained an independent duchy, and in 1637, on the extinction of the ducal family, it was annexed to Sweden. On the death of Charles XII. it was ceded to the electoral house of Brandenburg, with the exception of a part which subsequently was also obtained by Prussia. For administrative purposes it is divided into three governments, Stettin, Köslin, and Stralsund. Pop. 1890, 1,520,889.

Pomfret, JOHN, English poet, born 1667, died 1703. He was rector of Maulden in Bedfordshire, and published a volume of Poems in 1699, one of which, 'The Choice,' was for long very popular. His life was written by Dr. Johnson.

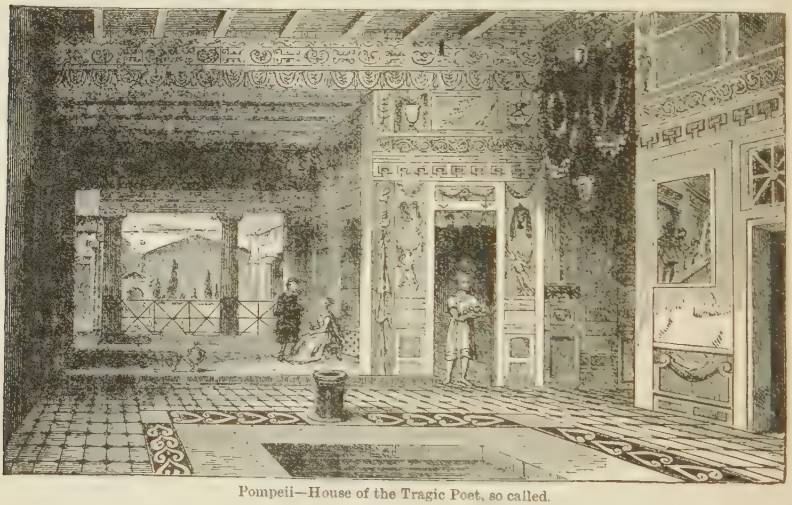
Pomo'na, among the Romans, the goddess of fruit, and wife of Vertumnus. At Rome she was usually represented with a basket of fruit, or with fruit in her bosom.

Pomo'na, or MAINLAND, the largest and most populous of the Orkney Islands; length from north-west to south-east, 23 miles; extreme breadth about 15 miles, but at the town of Kirkwall only about 2½ miles; area, 150 square miles; pop. 17,165. It is extremely irregular in shape, and on all sides except the west is deeply indented by bays and creeks. The surface is covered in great part by moor and heath, but good pasture is also to be found, and in the valleys a good loamy soil occurs. The principal towns are Kirkwall and Stromness. See *Orkney*.

Pompadour (poṇ-pȧ-dör), JEANNE ANTOINETTE POISSON, MARQUISE DE, the mistress of Louis XV., was born in 1721, and was said to be the daughter of the farmer-general Lenormand de Tournehem, who at his death left her an immense fortune. In 1741 she married her cousin, Lenormand d'Etiolles. A few years later she succeeded in attracting the attention of the king, and soon entirely engrossed his favour. In 1745 she appeared at court as the Marquise de Pompadour. Here she at first posed as the patroness of learning and the arts, but with the decay of her charms she devoted her attention to state affairs. Her favourites filled the most important offices, and she is said to have brought about the war with Frederick II. She died in 1764, at the age of forty-four, hated and reviled by the nation.

Pompeii (pom-pē'yī), an ancient city of Italy, in Campania, near the Bay of Naples, about 12 miles south-east from the city of that name, and at the base of Mount Vesuvius on its southern side. Before the close of the republic, and under the early emperors, Pompeii became a favourite retreat of wealthy Romans. In A.D. 63 a fearful earthquake occurred, which destroyed a great part of the town. The work of rebuilding was soon commenced, and the new town had a population of some 30,000 when it was overtaken by another catastrophe on 24th August, A.D. 79. This consisted in an eruption of Mount Vesuvius, which suddenly belched forth tremendous showers of ashes, red-hot pumice-stone, &c., so as to overwhelm the city for a considerable depth. The present superincumbent mass is about 20 feet in thickness. A portion of this was formed by subsequent eruptions, but the town had been buried by the first catastrophe and entirely lost to view. Pompeii was consigned to oblivion during the middle ages, and it was not until 1748, when a peasant in sinking a well discovered a painted chamber with statues and other objects of antiquity, that anything like a real interest in the locality was excited. Excavations were now prosecuted, and in 1755 the amphitheatre, theatre, and other parts were cleared

out. Under the Bourbons the excavations were carried out on a very unsatisfactory plan. Statues and articles of value alone were extricated, whilst the buildings were suffered to fall into decay or covered up again. To the short reign of Murat (1808–15) we are indebted for the excavation of the Forum, the town walls, the Street of Tombs, and many private houses. Latterly the government of Victor Emmanuel assigned £2500 annually for the prosecution of the excavations, and a regular plan has been adopted, according to which the ruins are systematically explored and carefully preserved. The town is built in the form of an irregular oval extending from east to west. The circumference of the walls amounts to 2925 yards. The area within the walls is estimated at 160 acres; greatest length, ¾ mile; greatest breadth, ½ mile. There are eight gates. The streets are straight and narrow and paved with large polygonal

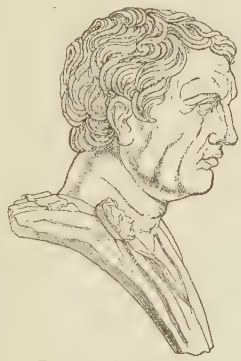


Pompeii—House of the Tragic Poet, so called.

blocks of lava. The houses are slightly constructed of concrete, or occasionally of bricks. Numerous staircases prove that the houses were of two or three stories. The ground floor of the larger houses was generally occupied by shops. Most of the larger houses are entered from the street by a narrow passage (*vestibulum*) leading to an internal hall (*atrium*), which provided the surrounding chambers with light and was the medium of communication; beyond the latter is another large public apartment termed the *tabulinum*. The other portion of the house comprised the private rooms of the family. All the apartments are small. The shops were small and all of one character, having the business part in front and one or two small chambers behind, with a single large opening serving for both door and window. The chief public buildings are the so-called Temple of Jupiter, the Temple of Venus, the Basilica, the Temple of Mercury, the Curia, and the Pantheon or Temple of Augustus. There are several interesting private buildings scattered through the town, including the villa of Diomedes, the house of Sallust, and the house of Marcus Lucretius. The Museum of Naples owes many of its most interesting features to the ornaments, &c., found in the public and private edifices above mentioned.

Pompey, in full CNEIUS POMPEIUS MAGNUS, a distinguished Roman, born B.C. 106, was the son of Cneius Pompeius Strabo, an able general. In B.C. 89 he served with distinction under his father in the war against the Italian allies. In the struggle between Marius and Sulla, Pompey raised three legions to aid the latter, and regained all the territories of Africa which had forsaken the interest of Sulla. This success excited the jealousy of Sulla, who recalled him to

Rome. On his return Sulla greeted him with the surname of Magnus (Great). Pompey demanded a triumph, to which Sulla reluctantly consented. He entered Rome in triumph in September 81, and was the first Roman permitted to do so without possessing a higher dignity than that of equestrian rank. After the death of Sulla, Pompey put an end to the war which the revolt of Sertorius in Spain had occasioned, and in 71 obtained a second triumph. In this year, although not of legal age and without official experience, he was elected consul with Crassus.



Pompey.—Antique Gem.

In 67 he cleared the Mediterranean of pirates, and destroyed their strongholds on the coast of Cilicia. In the four years, 65–62, he conquered Mithridates, Tigranes, and Antiochus, king of Syria. At the same time he subdued the Jews and took Jerusalem by storm. He returned to Italy in 62 and disbanded his army, but did not enter Rome until the following year, when he was honoured with a third triumph. Pompey, in order to strengthen his position, united his interest with that of Cæsar and Crassus, and thus formed the first triumvirate. This agreement was concluded by the marriage of Pompey with Cæsar's daughter Julia; but the powerful confederacy was soon broken. During Cæsar's absence in Gaul Pompey ingratiated himself with the senate, was appointed sole consul, and the most important state offices were filled with Cæsar's enemies. Through his influence Cæsar was proclaimed an enemy to the state, and his rival was appointed general of the army of the republic. Cæsar crossed the Rubicon in 49 (see *Cæsar*), and in sixty days was master of Italy without striking a blow. Pompey crossed over to Greece, and in this country, on the plains of Pharsalia, occurred the decisive battle which made Cæsar master of the Roman world. Pompey fled to Egypt, where he hoped to find a safe asylum. The ministers of Ptolemy betrayed him, and he was stabbed on landing by one of his former centurions in B.C. 48.

Pompey's Pillar, a celebrated column, standing on an eminence about 1800 feet to the south of the present walls of Alexandria in Egypt. It consists of a Corinthian capital, shaft, base, and pedestal. The total height of the column is 104 feet; the shaft, a monolith of red granite, is 67 feet long, and 9 feet in diameter below and not quite 8 at top. It is named from the Roman prefect Pompeius, who erected it in honour of Diocletian about or soon after 302 A.D.

Pomponius Mela. See *Mela*.

Ponape, one of the Caroline Islands (which see).

Ponce de Leon (pon'the de le-on'), JUAN, one of the early Spanish discoverers in America, born about 1460, died at Cuba 1521. He accompanied Columbus on his second expedition in 1493, and was sent by Ovando to conquer the island of Porto Rico. Having there amassed great wealth, and received information of an island situated to the north, he discovered the country, to which he gave the name of Florida. Ponce returned to Spain in 1513, and was appointed by Ferdinand governor of the island of Florida, as he called it, on condition that he should colonize it. In 1521 he embarked nearly all his wealth in two ships, and proceeded to take possession of his province. He was, however, met with determined hostility by the natives, who made a sudden attack upon the Spaniards, and drove them to their ships. In the combat Ponce de Leon was mortally wounded.

Ponce de Leon, LUIS, a Spanish lyric poet, born in 1527, probably at Granada, died 1591. He entered the order of St. Augustine at the age of sixteen, and became professor of sacred literature at Salamanca. He translated the Song of Solomon into Castilian, for which he was brought before the Inquisition at Valladolid (1572) and thrown into prison. At the end of five years he was liberated and reinstated in all his offices, and was elected head of his order. His original productions are chiefly of a religious character.

Poncho (pon'chō), a kind of cloak much worn by the South American Indians, and also by many of the Spanish inhabitants. It is a piece of thick woollen cloth of rectangular form, from 5 to 7 feet long and 3 to 4 feet broad, with a hole in the centre for the head to pass through.

Pondicherry (French, *Pondichéry*), a town, capital of the French East Indian settlement of the same name, on the east or Coromandel coast, 85 miles south by west from Madras. Its territory is surrounded on the land side by the British district of South Arcot, and has an area of 115 square miles; pop. 140,945. The town stands on a sandy beach, and consists of two divisions separated by a canal. The 'White Town,' or European quarter, on the east, facing the sea, is very regularly laid out, with well-built houses. The 'Black Town,' or native quarter, on the west, consists of houses or huts of brick or earth, and a few pagodas. There is an iron pier, and railway communication with the South Indian system was opened in 1879. The settlement was purchased by the French from the Bejapoor rajah in 1672, and has been repeatedly in the hands of the British.

Pondoland, a maritime territory of S. Africa, between Cape Colony and Natal, measuring about 90 miles from N.E. to S.W., and about 50 from N.W. to S.E. Pop. about 200,000. It was the last remnant of Independent Kaffraria, and became a British protectorate in 1884.

Pondweed. See *Potamogeton.*

Poniatowski, an illustrious Polish family. STANISLAUS, Count Poniatowski, born 1678, died 1762, is known for his connection with Charles XII., whom he followed into Turkey. He wrote Remarques d'un Seigneur Polonais sur l'Histoire de Charles XII. par Voltaire (Hague, 1741). — His eldest son, STANISLAUS AUGUSTUS, born 1732, the favourite of Catharine II., was elected king of Poland in 1764.—JOZEF, the nephew of King Stanislaus, born in 1762, served against the Russians in 1792, and in 1794 joined the Poles in their attempt to drive the Russians out of the country, and commanded a division at the sieges of Warsaw. In 1809 he commanded the Polish army against the superior Austrian force which was sent to occupy the Duchy of Warsaw, and compelled it to retire. In 1812 he led the Polish forces against Russia. During the battle of Leipzig Napoleon created him a marshal.

Ponsard (poṇ-sär), FRANÇOIS, French dramatist, born at Vienne, in Dauphiné, 1814; died 1867. His first success was his Lucrèce, produced in 1843, and welcomed as a return to classicism. Among his other pieces are Agnès de Méranie, Charlotte Corday, L'Honneur et l'Argent, &c. He became a member of the Academy in 1855.

Ponta-Delga'da, or PONTE-DELGADA, a seaport on the south side of the island of St. Michael, one of the Azores. It is built with considerable regularity, and the houses are substantial. A recently constructed breakwater has much improved the anchorage, and it has now an excellent harbour. The chief exports are wheat, maize, and oranges. Pop. about 21,000.

Pont-a-Mousson (poṇ-tȧ-mö-sōṇ), a town of France, dep. of Meurthe-et-Moselle, 16 miles north-west of Nancy, on both sides of the Moselle, here crossed by a bridge. It has a handsome Gothic church dedicated to St. Martin; the old abbey of St. Mary, now converted into a seminary; a college, &c. Pop. 9810.

Pontchartrain (pont-chȧr'trān), a lake of Louisiana, U. States, bordering on New Orleans, about 40 miles long from east to west, and nearly 25 in breadth. It is from 12 to 14 feet deep, and communicates with Lake Borgne on the east, with Lake Maurepas on the west, and by means of a canal with New Orleans on the south.

Ponte-Corvo, a town of S. Italy, prov. of Caserta, 20 miles south-east of Frosinone, in an isolated territory on the left bank of the Garigliano. It is the see of a bishop, has manufactures of maccaroni and plastic ware, and the whole district is rich in Roman remains. It was the capital of a principality created by Napoleon I., and from which Bernadotte had his title of Prince de Ponte-Corvo. Pop. 9601.

Pontede'ra, a town of Italy, prov. Pisa, on the Era, not far from its mouth, on the Arno; manufactures cotton goods. Pop. 6687.

Pon'tefract, or colloquially, POMFRET, a municipal and parliamentary borough of England, in the county and 24 miles S.S.W. of York, near the confluence of the Aire and Calder. It is well built, and has the remains of a Norman castle, which was the scene of the murder of Richard II. and other atrocities. This was the last garrison to hold out for Charles I., and was dismantled in 1649. The chief manufactures are iron and brass castings, earthenware, bricks, tiles, pipes, &c.; besides considerable trade in small lozenges prepared from liquorice, known for centuries under the name of Pomfret cakes. There are large collieries in the vicinity. Pop. 1891, 16,407.

Pontevedra (pon-te-vā'drȧ), a town in North-west Spain, capital of a province of the same name. It is surrounded by an old

wall; consists of broad, well-paved streets, and well-built houses of granite, and has manufactures of cotton, velvet, woollen and cotton cloth, hats, leather, &c. Pop. 20,012. — The province produces in abundance maize, rye, wheat and millet, flax, fruit, and wine, and rears great numbers of cattle. Area, 1730 square miles; pop. 463,564.

Ponthieu (pon-ty*eu*), an ancient county of France, in Picardie, capital Abbeville.

Pontiac, Oakland co., Mich., a thriving city, with large trade in wool and agricultural productions; has a State insane asylum, which is a very fine edifice. Pop. 1890, 6200.

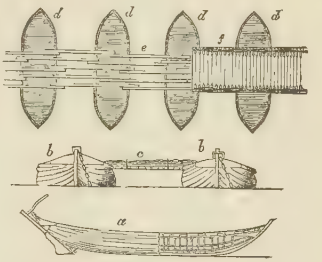
Pontianak', the capital of the Dutch settlements on the W. coast of Borneo, at the confluence of the Landak and Kapuas, almost on the equator. It has some trade in gold-dust, diamonds, sugar, rice, coffee, cotton, and edible birds'-nests. Pop. 15,000.

Pon'tifex, among the ancient Romans a priest who served no particular divinity. The Roman pontifices formed the most illustrious among the great colleges of priests. Their institution was ascribed to Numa, and their number varied at different periods from four to sixteen. The *pontifex maximus*, or chief pontiff, held his office for life, and could not leave Italy. The emperor afterwards assumed this title until the time of Theodosius, and it subsequently became equivalent to pope.

Pontine Marshes, an extensive marshy tract of land in Italy, in the S. part of the Roman Campagna, extending along the shores of the Mediterranean for about 24 miles, with a mean breadth of 7 miles. The Romans, by the construction of the Appian way and by means of canals, laid a considerable part of them dry, and many of the popes engaged in the drainage and reclaiming of the marshes. But notwithstanding all these labours, now completely abandoned, the air of this region is far from being salubrious, and the vast tract is inhabited by a scanty population of husbandmen and shepherds, who, if possible, spend only a part of the year here.

Pontoise (pon-twäz), a town in France, department of Seine-et-Oise, at the confluence of the Viosne with the Oise. It has manufactures of chemical products, hosiery, &c. Pop. 6675.

Pontoon', in military engineering, a flat-bottomed boat, or any light framework or floating body used in the construction of a temporary bridge over a river. One form of pontoon, used in the British service, is a hollow tin-plate cylinder, with hemispherical ends, and divided by several longitudinal and transverse partitions to act as braces and to prevent sinking if pierced by a shot or by accident. Another is in the form of a decked canoe, and consists of a timber frame covered



Pontoon and Pontoon Bridge.

a, Pontoon, external and internal structure. *b b*, End of same, supporting the roadway, *c*.—Plan of bridge. *d d*, Pontoons. *e*, Rafters for supporting the roadway. *f*, Roadway complete.

with sheet copper. It is formed in two distinct parts, which are locked together for use and dislocated for transportation, and is also divided into air-tight chambers. The name is also given to a water-tight structure or frame placed beneath a submerged vessel and then filled with air to assist in refloating the vessel; and to a water-tight structure which is sunk by filling with water and raised by pumping it out, used to close a sluice-way or entrance to a dock.

Pontop'pidan, Erik, Danish writer, born in 1698, died 1764. He became preacher to the court in 1735, and soon after professor of theology in Copenhagen. In 1747 he was made bishop of Bergen, and 1755 chancellor of Copenhagen University. Pontoppidan wrote several works of historical and scientific interest, including Natural History of Norway, Annals of the Danish Church, &c.

Pontus, a kingdom in Asia Minor (so called from the Pontus Euxinus, on which it lay), which extended from Halys on the west to Colchis on the east, and was bounded on the north by the Euxine Sea, and on the south by Galatia, Cappadocia, and Armenia Minor. The first king was Artabazes, son of Darius. The kingdom was in its most flourishing state under Mithridates the Great. But soon after his death (B.C. 63) it was conquered by Cæsar, and made tributary to the Roman Empire. In 1204 Alexius Comnenus founded a new kingdom

in Pontus, and in 1461 Mohammed II. united it with his great conquests.

Pontus Euxi'nus, the ancient name for the Black Sea (which see).

Pontypool, a town and important railway centre of England, in the county and 15½ miles south-west of Monmouth. The greater portion of the population is employed in iron-works and forges and works for making tin-plate. Pop. 5244.

Pontyprydd, a town of South Wales, in Glamorganshire, at the confluence of the Rhondda with the Taff. It has rapidly increased in recent times owing to the adjacent coal and iron mines. Pop. 19,971.

Pony, a term applied to several sub-varieties or races of horses, generally of smaller size than the ordinary horses, and which are bred in large flocks and herds in various parts of the world, chiefly for purposes of riding and of lighter draught work. Among well-known breeds are the Welsh, Shetland, Iceland, Exmoor, New Forest, and Scotch Highland.

Poodle, a small variety of dog covered with long, curling hair, and remarkable for its great intelligence and affection. The usual colour is white, but black and blue, if good in other points, are highly valued.

Poole, a seaport of England, county of Dorset, on the north part of Poole Harbour, an ancient place. The old town is being surrounded by handsome suburbs at a rapid rate, and there are many fine public buildings. The manufactures consist chiefly of cordage and sail-cloth; there are also potteries, large flour-mills, and two iron-foundries. The harbour is large and commodious, with excellent quays and extensive warehouses. The chief exports are clay for the Staffordshire potteries, and manufactured clay goods. Pop. 1891, 15,405.

Poole, Matthew, the compiler of the Synopsis Criticorum Biblicorum, was born at York about 1624, died at Amsterdam 1679. He studied at Emmanuel College, Cambridge, and took orders. In 1662 he was ejected by the Act of Uniformity from his church of St. Michael-le-Querne in London, and subsequently retired to Holland. He devoted ten years to his Synopsis, which is an attempt to condense into one work all biblical criticisms written previous to his own times.

Poonac, the substance left after cocoa-nut oil is expressed from the nuts, used as manure and for feeding stock.

Poonah, or Puna, a city and district of Hindustan, in the presidency of Bombay. It is about 119 miles east of Bombay by the Great Indian Peninsular Railway. The city is well built, and has the Deccan college for classics, mathematics, and philosophy, and a college of science with special training in civil engineering, also training college, female normal school, and other schools, public library, hospital, arsenal, barracks, &c. It was the capital of the Peishwa, or head of the Mahratta confederacy. It is a health resort, and for part of the year the seat of the Bombay government. Manufactures include gold and silver jewelry, small ornaments in brass, copper, and ivory, and silk and cotton fabrics. It is an important military station (the cantonments lying to the north of the town), and good roads connect it with Bombay, Ahmednagar, Sattarah, &c. Pop. 129,751, of whom 30,129 are in the cantonments.—The district has an area of 5348 sq. miles, and a pop. of 900,621. It is an elevated table-land, watered by the Bhima and its tributaries, and abounding in isolated heights, formerly crowned with strong fortresses. Inhabitants chiefly Mahrattas.

Poon (or Poona) **Wood** is the wood of the poon tree (*Calophyllum inophyllum* and *Calophyllum angustifolium*), a native of India. It is of a light, porous texture and is much used in the East Indies in ship-building for planks and spars. The Calcutta poon is preferred to that of other districts. Poon seed yields an oil called *dilo*, poon-seed oil, &c.

Poop, the aftermost and highest part of the hull in large vessels; or, a partial deck in the aftermost part of a ship above the deck proper.

Poor, those who lack the means necessary for their subsistence. At no period in the history of the world, and amongst no people, can there be said to have existed no poor, and probably in all civilized communities some provision, however inadequate, has been made for their support. In Rome, in its earlier days at least, the contest between the plebeians and patricians partook very much of the nature of a struggle between poverty and riches, and in later times corn or bread was often doled out free to needy citizens. During the middle ages the great majority of the people were maintained in a state of bondage by their feudal superiors, and many freemen, in order to avoid destitution, surrendered their liberty and became serfs. In all the countries of modern Europe laws have been enacted relative to the main-

tenance of the poor. In England, up to the time of Henry VIII., the poor subsisted entirely on private benevolence. Numerous statutes were passed in the reign of Henry VIII. and following reigns to provide for the poor and 'impotent,' but these were far from sufficient to meet the requirements of the kingdom. Accordingly other measures were adopted, and by 43 Eliz. cap. ii. (1601) overseers of the poor were appointed in every parish. Their chief duties were: first, to provide relief for the poor, old, and impotent; and secondly, to provide work for the able-bodied out of employment. For these purposes they had power to levy rates on the inhabitants of the parish. This act of Elizabeth is the basis of the present English poor-law system. The statute of 1601 was modified by a law of Charles II. in 1662, and from this period till 1834 the administration of relief was intrusted to the churchwardens and inspectors. In 1782 *Gilbert's Act* was passed, authorizing the voluntary union of several adjacent parishes to found and support a poor-house for the reception of paupers requiring permanent succour; and their control was intrusted to *guardians*. The working of these laws was attended with numerous abuses, and in 1834 the Poor Law Amendment Act was passed, which with some more recent statutes, particularly those of 1844 and 1857, forms the legislation in actual operation at the present day.

By the act of 1834 each locality forms an aggregation of a number of parishes called a *union*. In England and Wales there are 647 such unions, comprising 14,827 poor-law parishes. Each union is supervised by a committee of guardians, consisting of all county justices residing within the union, and others named by the ratepayers. This committee fixes the amount of contributions, and ordains and directs the distribution of relief. The general direction of the whole system was by this act placed in the hands of three crown commissioners, who were authorized to make rules upon all matters relating to the management and maintenance of the poor. By the act of 1834 all relief is refused to the able-bodied poor, except in workhouses established on a very rigorous basis. By 10 and 11 Vict., cap. cix. (1847), all the powers and duties of the commissioners were transferred to the Poor-law Board, which consisted of a president and four commissioners. In 1871 an act was passed, providing for the establishment of a board to be called the Local Government Board, and all powers and duties vested in the Poor-law Board were transferred to the Local Government Board. The duty of making and levying the poor-rate still belongs to the churchwardens and overseers; and the concurrence of the inhabitants is not necessary. The rate is levied in advance for a part of the year on a scale adapted to the probable exigencies of the parish. As an occupier a man is ratable for all lands which he occupies in a parish, whether he is resident or not; but the tenant and not the landlord is considered as the occupier within this statute. The relief afforded to the poor since 1834 is of two kinds, *indoor* and *outdoor*. The total number of paupers in England and Wales is about one-thirtieth of the population.

In the law of Scotland two kinds of poor are recognized, the *idle* and the *infirm*. With regard to the former several acts have been passed for the punishment of sturdy beggars and vagabonds. The act by which the relief of the poor is now administered is 8 and 9 Vict. c. lxxxiii. (amended by 24 and 25 Vict. c. xviii.). In Ireland there were no poor-laws till 1838. By 1 and 2 Vict. cap. lvi., passed in that year, Ireland is divided into 163 unions of town-lands or parishes. Each union has a workhouse, managed by a board of guardians elected by the rate-payers. Every destitute person has an absolute right to relief. A legal claim to relief exists in most of the northern European countries, but in others no such edict as a poor-law exists. Poor-laws in the U. States are of local enactment. General laws have been passed by some of the states, but town authorities usually adopt regulations for the care of the poor. Several states have passed what are called 'tramp laws,' making it a criminal offence for the class of paupers generally styled 'tramps' to wander through the state without 'visible means of support.' In some states the farming out of the town poor to the lowest bidder is still practised. The town in which a pauper has legal settlement is required to support him.

Pooree, a town and district in the province of Orissa (India). The town is 250 miles S.W. from Calcutta, and 595 miles N. of Madras. It contains the shrine of Juggernaut, to whose worship crowds flock from every part of India. Pop. 22,695. The district has an area of 2473 square miles, and a population of 888,487.

Poore, BENJAMIN PERLEY, journalist, was born near Newburyport, Mass., in 1820. His life-work was that of Washington correspondent. His letters to the Boston Journal and to other papers gained him a national reputation by their trustworthy character. He was an industrious collector of historical matter. He published several works, some of which had large circulation. In 1867 he began to edit the Congressional Directory; brought out the annual abridgment of the public documents for many years; also made a compilation of United States treaties with different countries. He died in 1887.

Popayan', a city of Colombia, and capital of the state of Cauca, situated near the river Cauca, and 228 miles s.w. of Bogotá. It is the see of a bishop, and has a university, a cathedral, an hospital, and other public buildings. In 1834 it was nearly destroyed by an earthquake. Pop. 20,000.

Pope (Latin *papa*, Greek *papas*, father), the title given to the head of the Roman Catholic hierarchy. It seems to have been used at first in the early church as a title of reverence given to ecclesiastics generally, and at the present time it is applied in the Greek Church to all priests. In the early Western Church the title of pope was ultimately bestowed upon the metropolitan bishops, but in the struggle for pre-eminence the claim to be recognized as the only pope was enforced by the Bishop of Rome. This claim of pre-eminence was founded on the belief, supported by the early traditions of the church, that the Apostle Peter planted a church in Rome, and that he died there as a martyr. This tradition, taken in connection with the alleged pre-eminence of Peter among Christ's disciples, came to be regarded as sufficient reason for the primacy of the Bishop of Rome in the church. Consequently from the end of the 4th century the Bishop of Rome was the first among the five patriarchs or superior bishops of Christendom. A decree of the emperor Valentian III. (445) acknowledged the Bishop of Rome as primate, but until the 8th century many measures of the popes met with violent opposition. Leo the Great (440–461) was the first to base his claims to the primacy on divine authority by appealing to Matt. xvi. 18; and he did much to establish the theory that bishops in disputes with their metropolitans had a right of appeal to Rome. The Eastern Church always resisted the see of Rome, and this mainly occasioned the schism that in 1054 divided Christendom into the Greek and Roman Churches. After the 8th century several circumstances contributed to open to the popes the way to supreme control over all churches. Amongst these were the establishment of missionary churches in Germany directly under Rome, the pseudo-Isidorian decretals, which contained many forged documents supporting the general supremacy of the Roman pontiff, the gradations of ecclesiastical rank, and the personal superiority of some popes over their contemporaries. Leo the Great (440–461), Gregory I., the Great (590–604), and Leo III. (795–816), who crowned Charlemagne, all increased the authority of the papal title. Much violence and corruption prevailed in the Roman see during the middle ages. In 1059 the dignity and independence of the papal chair were heightened by the constitution of Nicolas II., placing the right of election of the pope in the hands of the cardinals. In 1073 Gregory VII., at a Roman council, formally prohibited the use of the title of pope by any other ecclesiastic than the Bishop of Rome; he also enforced a celibate life upon the clergy, and prohibited lay investiture. The reign of Innocent III. (1198–1216) raised the papal see to the highest degree of power and dignity; and having gained almost unlimited spiritual dominion, the popes now began to extend their temporal power also. The dominions under the pope's temporal rule had at first consisted of a territory granted to the papal see by Pepin in 754, which was subsequently largely increased. The popes, however, continued to have to some extent the position of vassals of the German empire, and until the 12th century the German emperors suffered no election of pope to take place without their sanction. Innocent III., however, largely increased his territories at the expense of the empire, and the power of the emperors over Rome and the pope may now be said to have come to an end. Favourable circumstances had already made several kingdoms tributary to the papal see, which had now acquired such power that Innocent III. took upon him to depose and proclaim kings, and put both France and England under an interdict. France alone first successfully resisted the popes. In Philip the Fair Boniface VIII. found a master, and his successors between 1307 and 1377 remained under French influence, and held their courts at Avignon.

Their dignity sunk still lower in 1378 when two rival popes appeared, Urban VI. and Clement VII., causing a schism and scandal in the church for thirty-eight years. This schism did much to lessen the influence of the popes in Christendom, and it subsequently received a greater blow from the Reformation. During the reign of Leo X. (1513–25) Luther, Zuinglius, and Calvin were the heralds of an opposition which separated almost half the West from the popes, while the policy of Charles V. was at the same time diminishing their power, and from this time neither the new support of the Society of Jesuits nor the policy of the popes could restore the old authority of the papal throne. The national churches obtained their freedom in spite of all opposition, and the Peace of Westphalia (1648), bringing to an end the Thirty Years' war and the religious struggle in Germany, gave public legality to a system of toleration which was in direct contradiction to the papal doctrines. The bulls of the popes were now no longer of avail beyond the states of the church without the consent of the sovereigns, and the revenues from foreign kingdoms decreased. Pius VI. (1775–98) witnessed the revolution which not only tore from him the French Church, but even deprived him of his dominions. In 1801, and again in 1809, Pius VII. lost his liberty and possessions, and owed his restoration in 1814 to a coalition of temporal princes, among whom were two heretics (English and Prussian) and a schismatic (the Russian). Nevertheless he not only restored the Inquisition, the order of the Jesuits, and other religious orders, but advanced claims and principles entirely opposed to the ideas and resolutions of his liberators. The same spirit that actuated Pius VII. actuated in like manner his successors, Leo XII. (1823–29), Pius VIII. (1829–30), and above all Gregory XVI. (1831–46). The opposition of the latter to all reforms in the civil relations of the papal dominions contributed greatly to the revolution of 1848, which obliged his successor, Pius IX., to flee from Rome. The power of the papacy was further weakened by the events of 1859, 1860, and 1866. And after the withdrawal of the French troops from Italy in 1870, King Victor Emmanuel took possession of Rome, and since that time the pope has lived in seclusion in the Vatican.

By the decrees of the Vatican Council of 1870 the pope has supreme power in matters of discipline and faith over all and each of the pastors and of the faithful. It is further taught by the Vatican Council that when the pontiff speaks *ex cathedra*, that is when he, in virtue of his apostolic office, defines a doctrine of faith and morals to be held by the whole church, he possesses infallibility by divine assistance. The pope cannot annul the constitution of the church as ordained by Christ. He may condemn or prohibit books, alter the rites of the church, and reserve to himself the canonization of saints. A pope has no power to nominate his successor, election being entirely in the hands of the cardinals, who are not bound to choose one of their own body. The papal insignia are the tiara or triple crown, the straight crosier, and the pallium. He is addressed as 'Your holiness.'

We subjoin a table of the popes, according to the Roman Notizie, with the dates of the commencement of their pontificates. The names printed in italics are those of anti-popes :—

	A.D.
St. Peter	42
St. Linus	66
St. Anacletus	78
St. Clement I.	91
St. Evaristus	100
St. Alexander I.	108
St. Sixtus I.	119
St. Telesphorus	127
St. Hyginus	139
St. Pius I.	142
St. Anicetus	167
St. Soterus	168
St. Eleutherius	177
St. Victor I.	193
St. Zephirinus	202
St. Callixtus I.	217
St. Urban I.	223
St. Pontianus	230
St. Anterus	235
St. Fabian	236
St. Cornelius	250
St. Lucius I.—*Novatianus*	252
St. Stephen I.	253
St. Sixtus II.	257
St. Dionysius	259
St. Felix I.	269
St. Eutychianus	275
St. Caius	283
St. Marcellinus	296
(See vacant 3 years and 6 months.)	
St. Marcellus I.	308
St. Eusebius	310
St. Melchiades or Miltiades	311
St Sylvester I.	314
St. Marcus	336
St. Julius I.	337
Liberius	352
St. Felix II. (sometimes reckoned an Anti-pope)	355
St. Damasus I.	366
St. Siricius	384
St. Anastasius I.	398
St. Innocent I.	402
St. Zosimus	417
St. Boniface I.—*Eulalius*	418
St. Celestine I.	422
St. Sixtus III.	432
St. Leo I. the Great	440
St. Hilary	A.D. 461
St. Simplicius	468
St. Felix III.	483
St. Gelasius I.	492
St. Anastasius II.	496
St. Symmachus	498
St. Hormisdas — *Laurence*	514
St. John I.	523
St. Felix IV.	526
Boniface II.—*Dioscorus*	530
John II.	533
St. Agapetus I.	535
St. Sylverius	536
Vigilius	537
Pelagius I.	555
John III.	560
Benedict (I.) Bonosus	574
Pelagius II.	578
St. Gregory I. the Great	590
Sabinianus	604
Boniface III.	607
St. Boniface IV.	608
St. Deusdedit	615
Boniface V.	619
Honorius I.	625
(See vacant 1 year and 7 months.)	
Severinus	640
John IV.	640
Theodorus I.	642
St. Martin I.	649
St. Eugenius I.	654
St. Vitalianus	657
Adeotatus	672
Donus or Domnus I.	676
St. Agathon	678
St. Leo II.	682
St. Benedict II.	684
John V.	685
Conon — *Theodorus; Paschal*	686
St. Sergius I.	687
John VI.	701
John VII.	705
Sisinnius	708
Constantine	708
St. Gregory II.	715
St. Gregory III.	731
St. Zachary	741
Stephen II. (died before consecration)	752

Stephen III.....A.D. 752
St. Paul I.—*Constantine; Theophylactus; Philip* 757
Stephen IV..... 768
Adrian I..... 772
St. Leo III..... 795
Stephen V..... 816
St. Paschal I..... 817
Eugenius II..... 824
Valentinus..... 827
Gregory IV..... 827
Sergius II..... 844
St. Leo IV..... 847
Benedict III.—*Anastasius*..... 855
St. Nicholas I..... 858
Adrian II..... 867
John VIII..... 872
Marinus I., or Martin II..... 882
Adrian III..... 884
Stephen VI..... 885
Formosus..... 891
Boniface VI. (reigned only 18 days)..... 896
Stephen VII..... 896
Romanus..... 897
Theodorus II.—*Sergius III.*..... 898
John IX..... 898
Benedict IV..... 900
Leo V..... 903
Christopher..... 903
Sergius III..... 904
Anastasius III..... 911
Lando..... 913
John X..... 914
Leo VI..... 928
Stephen VIII..... 929
John XI..... 931
Leo VII..... 936
Stephen IX..... 939
Marinus II., or Martin III..... 943
Agapetus II..... 946
John XII.—*Leo VIII.*.. 956
Benedict V..... 964
John XIII..... 965
Benedict VI..... 972
Donus or Domnus II... 974
Benedict VII..... 975
John XIV. — *Boniface VII*..... 983
John XV..... 985
Gregory V.—*John XVI.* 996
Sylvester II..... 999
John XVI. or XVII....1003
John XVII. or XVIII.1003
Sergius IV..... 1009
Benedict VIII. — *Gregory VI.*..... 1012
John XVIII. or XIX..1024
Benedict IX. (deposed) —*John XX*.....1033
Gregory VI.—*Sylvester III.*.....1045
Clement II.....1046
Damasus II.—*Benedict IX.* attempts to resume the throne.....1048
St. Leo IX.....1049
Victor II.....1055
Stephen X.....1057
Benedict X.....1058
Nicholas II.....1058
Alexander II.—*Honorius II.*.....1061
Gregory VII. (Hildebrand)—*Clement III.*.1073
(See vacant 1 year.)
Victor III.....1086
Urban II.....1088
Paschal II.....1099
Gelasius II.—*Gregory VIII.*.....1118
Callixtus II.....1119
Honorius II. — *Celestine II.*.....1124
Innocent II. — *Anacletus II.; Victor IV.*....1130
Celestinus II.....1143
Lucius II.....1144
Eugenius III.....1145
Anastasius IV.....A.D. 1153
Adrian IV. (Nicholas Breakspear, an Englishman).....1154
Alexander III.—*Victor V.; Paschal III.; Callixtus III.; Innocent III.*.....1159
Lucius III.....1181
Urban III.....1185
Gregory VIII.....1187
Clement III.....1187
Celestinus III.....1191
Innocent III.....1198
Honorius III.....1216
Gregory IX.....1227
Celestinus IV.....1241
(See vacant 1 year and 7 months.)
Innocent IV.....1243
Alexander IV.....1254
Urban IV.....1261
Clement IV.....1265
(See vacant 2 years and 9 months.)
Gregory X.....1271
Innocent V.....1276
Adrian V.....1276
John XIX. or XX. or XXI.....1276
Nicholas III.....1277
Martin IV.....1281
Honorius IV.....1285
Nicholas IV.....1288
(See vacant 2 years and 3 months.)
St. Celestinus V.....1294
Boniface VIII.....1294
Benedict XI.....1303
Clement V. (papacy removed to Avignon)...1305
(See vacant 2 years and 3 months.)
John XXII.....1316
Benedict XII.—*Nicholas V. at Rome*.....1334
Clement VI.....1342
Innocent VI.....1352
Urban V.—*Clement VII.*1362
Gregory XI. (throne restored to Rome).....1370
Urban VI.....1378
Boniface IX.—*Benedict XIII. at Avignon*.... 1389
Innocent VII.....1404
Gregory XII.....1406
Alexander V.....1409
John XXIII.....1410
Martin V. — *Clement VIII.*.....1417
Eugenius IV.—*Felix V.* 1431
Nicholas V.....1447
Callixtus III.....1455
Pius II.....1458
Paul II.....1464
Sixtus IV.....1471
Innocent VIII.....1484
Alexander VI.....1492
Pius III.....1503
Julius II.....1503
Leo X.....1513
Adrian VI.....1522
Clement VII.....1523
Paul III.....1534
Julius III.....1550
Marcellus II.....1555
Paul IV.....1555
Pius IV.....1559
St. Pius V.....1566
Gregory XIII.....1572
Sixtus V.....1585
Urban VII.....1590
Gregory XIV.....1590
Innocent IX.....1591
Clement VIII.....1592
Leo XI.....1605
Paul V.....1605
Gregory XV.....1621
Urban VIII.....1623
Innocent X.....1644
Alexander VII.....1655
Clement IX.....1667
Clement X.....1670
Innocent XI.....A.D. 1676
Alexander VIII.....1689
Innocent XII.....1691
Clement XI.....1700
Innocent XIII.....1721
Benedict XIII.....1724
Clement XII.....1730
Benedict XIV.....1740
Clement XIII.....1758
Clement XIV.....A.D. 1769
Pius VI.....1775
Pius VII.....1800
Leo XII.....1823
Pius VIII.....1829
Gregory XVI.....1831
Pius IX.....1846
Leo XIII.....1878

Pope, ALEXANDER, a celebrated English poet, was born May 21, 1688. His father was a London merchant and a devout Catholic. Soon after his son's birth the father retired to Binfield, near Windsor. Pope was small, delicate, and much deformed. His education was a desultory one. He picked up the rudiments of Greek and Latin from the family priest, and was successively sent to two schools, one at Twyford, the other in London. He was taken home at the age of twelve, received more priestly instruction, and read so eagerly that his feeble constitution threatened to break down. Before he was fifteen he attempted an epic poem, and at the age of sixteen his Pastorals procured him the notice of several eminent persons. In 1711 he published his poem the Essay on Criticism, which was followed by The Rape of the Lock, a polished and witty narrative poem founded on an incident of fashionable life. His next publications were The Temple of Fame, a modernization and adaptation of Chaucer's House of Fame; Windsor Forest, a pastoral poem (1713); and The Epistle of Eloisa to Abelard (1717). From 1713 to 1726 he was engaged on a poetical translation of Homer's works, the Iliad (completed in 1720) being wholly from his pen, the Odyssey only half. The pecuniary results of these translations showed a total profit of nearly £9000. In 1728 he published his Dunciad, a mock heroic poem intended to overwhelm his antagonists with ridicule. It is distinguished by the excessive vehemence of its satire, and is full of coarse abuse. This was followed by Imitations of Horace (among the most original of his works), and by Moral Epistles or Essays. His Essay on Man was published anonymously in 1733, and completed and avowed by the author in the next year. This work is distinguished by its poetry rather than by its reasonings, which are confused and contradictory. In 1742 he added a fourth book to his Dunciad, in which he attacked Colley Cibber, then poet-laureate. He died on May 30, 1744, and was interred at Twickenham. Pope was vain and irascible, and seems to have been equally open to flattery and prone to resentment; yet he was kind-hearted and

stanch to his friends, among whom he reckoned Swift, Arbuthnot, and Gay. His great weakness was a disposition to artifice to acquire reputation and applause. As a poet, no English writer has carried further correctness of versification. A large number of his letters were published in his own lifetime. There are various editions of Pope's works, the best being that by the Rev. W. Elwin and W. J. Courthope.

Poperinghe (po-per-aŋ), a town in Belgium, prov. W. Flanders, with some trade in hops and hemp. It has manufactures of woollens, lace, linen, pottery, &c. Pop. 11,065.

Popish Plot, an imaginary conspiracy which Titus Oates pretended to have discovered in 1678, and by which he succeeded in deluding the mind of the nation over a space of two years, and causing the death of many innocent Catholics. Oates alleged that the plot was formed by the Jesuits and Roman Catholics for the purpose of murdering the king, Charles II., and subverting the Protestant religion. Godfrey, a justice of the peace to whom Oates gave evidence, was found dead in a ditch (Oct. 17), and the Papists were accused of his murder, though nothing transpired to substantiate the charge. Parliament met soon afterwards, and the Commons passed a bill to exclude the Catholics from both houses. Oates received a pension, and this encouraged Bedloe, a noted thief and impostor, to come forward and confirm Oates's statements. He also accused several noblemen by name of a design to take up arms against the king. Coleman, secretary to the Duchess of York, a Jesuit named Ireland, and others were tried, condemned, and executed on the testimony of Oates and Bedloe. In 1680 Viscount Stafford was impeached by the Commons, condemned by the Lords, and executed (Dec. 29) as an accomplice of the plot, on the evidence of Oates and two of his associates. Soon after the accession of James II. (1685) Oates was convicted of perjury and other crimes. See *Oates*.

Poplar (*Populus*), a well-known genus of hardy deciduous trees, natural order Salicaceæ, with both barren and fertile flowers in catkins, stamens four to thirty, leaves alternate, broad, with long and slender footstalks flattened vertically, the leaves having generally more or less of a tremulous motion. About eighteen species have been observed, natives of Europe, Central and Northern Asia, and North America. Some of the poplars are the most rapid growers of all hardy forest trees. They thrive under a variety of conditions as regards soil, &c., but do best in damp situations. The timber of the poplar is white, light, and soft, and not very valuable. *P. fastigiāta*, the common Lombardy poplar, is well known as a tall tree with slender branches almost upright; it reaches a height of 100 to 150 feet. *P. nigra* is the common black poplar. *P. tremŭla* is the aspen. *P. alba*, the white poplar, often attains a height of 100 feet. *P. balsamifĕra* is the balsam-poplar or tacamahac of the U. States; *P. monilifĕra*, the cotton-wood of America; *P. candicans*, the Ontario poplar.

Poplin, a kind of finely woven fabric, made of silk and worsted. In the best poplins the warp is of silk and the weft of worsted, a combination which imparts peculiar softness and elasticity to the material; in the cheaper makes cotton and flax are substituted for silk, which produces a corresponding deterioration in the appearance of the stuff. The manufacture of poplin was introduced into Ireland from France in 1775 by Protestant refugees, and Ireland is still famous for its production.

Popocatepetl (Aztec, *popoca*, to smoke, and *tepetl*, a mountain), an active volcano in Mexico, in the province of Puebla; lon. 98° 33′ W.; lat. 18° 36′ N. Its height has been estimated at 17,884 feet. The crater is 3 miles in circumference and 1000 feet deep. Forests cover the base of the mountain, but its summit is mostly covered with snow.

Poppy, the common name for plants of the genus *Papāver*, type of the order Papaveraceæ. The species of poppy are herbaceous plants, all bearing large, brilliant, but fugacious flowers. The white poppy (*P. somnifĕrum*) yields the well-known opium of commerce. (See *Opium*.) Most of the species are natives of Europe, and four are truly natives of Britain. They often occur as weeds in fields and waste places, and are frequently also cultivated in gardens for ornament. The seeds of the white poppy yield a fixed harmless oil employed for culinary purposes; and the oil-cake is used for feeding cattle. The roots of the poppy are annual or perennial; the calyx is composed of two leaves, and the corolla of four petals; the stamens are numerous, and the capsule is one-celled, with several longitudinal partitions, and contains a multitude of seeds.

Population. The power of propagation inherent in all organic life may be regarded as infinite. There is no one species of vege-

table or animal which under favourable conditions as to space, climate, and food (that is to say, if not crowded and interfered with by others), would not in a small number of years overspread every region of the globe. To this property of organized beings the human species forms no exception. And it is a very low estimate of its power of increase if we only assume that, under favourable conditions, each generation might be double the number of the generation which preceded it. Taking mankind in the mass, the individual desire to contribute to the increase of the species may be held to be universal, but the actual growth of population is nowhere left to the unaided force of this motive, and nowhere does any community increase to the extent of its theoretical capacity, even though the growth of population has come to be commonly considered as an indispensable sign of the prosperity of a community. For one thing population cannot continue to increase beyond the means of subsistence, and every increase beyond actual or immediately attainable means, must lead to a destruction of life. But if population is thus actually limited by the means of subsistence, it cannot be prevented by these means from going further than these means will warrant; that is to say, it will only be checked or arrested after it has exceeded the means of subsistence. It becomes then an inquiry of great importance by what kind of checks population is actually brought up at the point at which it is in fact arrested. This inquiry was first systematically treated in an Essay on the Principle of Population published in 1798 by the Rev. T. R. Malthus. (See *Malthus.*) Malthus points out that population increases in a geometrical, while the means of subsistence only increase in an arithmetical ratio. And in examining the bearing on each other of the different ratios of increase of human life, and of the means of supporting it, he has deduced a law to the proof of which a considerable portion of his work is devoted. This law is that the energy of reproduction rises above all the ordinary accidents of human life, and the inevitable restraints imposed by the various organizations of human society, so that in all the various countries and climates in which men have lived, and under all the constitutions by which they have been governed, the normal tendency of population has always been to press continuously upon the means of subsistence. Malthus divides the checks on the increase of population into two classes, preventive and positive; the one consisting of those causes which prevent possible births from taking place, the other of those which, by abbreviating life, cut off actual excesses of population. In a further analysis of these checks he reduces them to three—vice, misery, and moral restraint. The proof of his main position is historical and statistical. In regard to the subsidiary inquiry, the most striking point brought out is the rarity of moral restraint and the uniform action, in innumerable forms, of vice and misery. In order that the latter should be weakened in their action, and the former strengthened, it is desirable to have the general standard of living in a community raised as high as possible, and that all may look to the attainment of a position of comfort by the exercise of prudence and energy. In an article read before the Académie des Sciences of Paris in 1887, by M. Levasseur, the following figures were quoted showing the density of population in the great divisions of the world:—

	Area in thousands of sq. miles.	Pop. in millions.	Density per sq. mile.
Europe	3,861	347	90
Africa	12,124	197	16
Asia	16,217	789	47
Oceania	4,247	38	9
N. America	9,035	80	8·8
S. America	7,066	32	4·6

Porbandar, a town of India, chief town of a native state of the same name, in the political agency of Kattyawar, Bombay. It is built on a creek on the S.W. coast of Gujerat, and has a brisk trade with Bombay and Malabar. Pop. 14,569. The state has an area of 535 square miles and a pop. of 72,077.

Por'beagle, a fish of the Lamnidæ family of sharks. Three species have been described; the best known is *Lamna cornubica*, which occurs in the North Atlantic, and frequently strays to the British coasts. It attains to a length of 10 feet, and feeds chiefly on fishes. The porbeagle has two dorsal fins, a wide mouth, lanceolate teeth, and very wide gill-openings.

Porcelain. See *China-ware* and *Pottery.*

Porcelain Crab (*Porcellāna*), a name for certain crustacea, typical of the family Porcellanidæ, small smooth crabs, of which two are British: *P. platychēles* the hairy, and *P. longicornis* the minute, porcelain crab.

Porch, an exterior appendage to a building, forming a covered approach to one of its principal doorways. The porches in some of the older churches are of two stories, having an upper apartment to which the name *parvis* is sometimes applied.—*The Porch* was a public portico in Athens (the *Stoa Poikile*) where the philosopher Zeno taught his disciples. Hence *The Porch* is equivalent to the *School of the Stoics*.

Porcia, an ancient Roman lady, a daughter of Cato of Utica. She first married M. Bibulus, Cæsar's colleague in the consulship (B.C. 59), by whom she had three children. Bibulus died in B.C. 48, and in B.C. 45 she married M. Brutus, who afterwards became the assassin of Cæsar. After the death of Brutus she put an end to her life.

Por'cupine, a name of certain rodent quadrupeds, the best-known species of which belong to the genus *Hystrix*. The body is covered, especially on the back, with the

Porcupine (*Hystrix cristāta*).

so-called *quills*, or dense solid spine-like structures, intermixed with bristles and stiff hairs. There are two incisors and eight molar teeth in each jaw, which continue to grow throughout life from permanent pulps. The muzzle is generally short and pointed, the ears short and rounded. The anterior feet possess four, and the hinder feet five toes, all provided with strong thick nails. The common or crested porcupine, *Hystrix cristāta*, found in Southern Europe and in Northern Africa, is the best-known species. When fully grown it measures nearly 2 feet in length, and some of its spines exceed 1 foot. Its general colour is a grizzled dusky black. The spines in their usual position lie nearly flat, with their points directed backwards; but when the animal is excited they are capable of being raised. The quills are loosely inserted in the skin, and may, on being violently shaken, become detached—a circumstance which may probably have given rise to the purely fabulous statement that the animal possessed the power of actually ejecting its quills like arrows or darts at an enemy. These animals burrow during the day, and at night search for food, which consists chiefly of vegetable matter. Of the American species, the Canadian or North American porcupine (*Erethizon dorsāta*) is the best known. It is about 2 feet long, and of slow and sluggish habits. The quills in this species are short, and are concealed amongst the fur. The ears are short, and hidden by the fur. The tail is comparatively short. The genus *Cercolabes* of South America possesses a distinctive feature in the elongated prehensile tail, adapting it for arboreal existence. These latter forms may thus be termed 'tree porcupines.' In length the typical species of this genus averages 1½ foot, the tail measuring about 10 inches.

Porcupine Ant-eater. See *Echidna*.

Porcupine Crab (*Lithōdes hystrix*), a species of crab covered with spines, found off the coasts of Japan. It is dull and sluggish in its movements.

Porcupine-fish (*Diodon hystrix*), a fish of the order Plectognathi, found in the tropical seas. It is about 14 inches long, and is covered with spines or prickles.

Porcupine-grass (*Triodia* or *Festūca irritans*), a brittle Australian grass which it is proposed to utilize in the manufacture of paper.

Porcupine-wood, a name for the wood of the cocoa-nut palm.

Pordeno'ne, a town of N. Italy, prov. of Udine, 40 miles N.N.E. of Venice. It is a well-built, stirring place, with manufactures of linen, copper utensils, paper, and glass, and a considerable trade. Pop. 7199.

Pordenone, IL (so called from his birthplace, Pordenone, his true name being Giovanni Antonio Licinio), or REGILLO DA PORDENONE, a painter of the Venetian school, born about 1484. He executed many works for his native place; some also for Mantua, Vicenza, and Genoa; but his greatest works were for Venice. He died in Ferrara 1540. Specimens of his works are to be found in many of the principal galleries of Europe.

Porgie (*Pagrus argyrops*), a fish of the family Sparidæ, with an oblong body, scaly cheeks, and one dorsal fin, found off the coasts of the United States. It is one of the most important food fishes, and attains a length of 18 inches and a weight of 4 lbs.

The name is also given to the Menhaden, which see.

Porif'era ('pore-bearing'), a term occasionally employed to designate the sponges.

Porism, a name given by ancient geometers to a class of mathematical propositions having for their object to show what conditions will render certain problems indeterminate. Playfair defined a porism thus: 'A proposition affirming the possibility of finding such conditions as will render a certain problem indeterminate, or capable of innumerable solutions.'

Pork, the flesh of swine, is one of the most important and widely-used species of animal food. Pork is coarser and ranker than beef or mutton, but when of good quality and well cured it develops a richness and delicacy of flavour in marked contrast with the dryness and insipidity of other salted meat. The abundance and digestive quality of its fat renders it a suitable diet for cold climates. The swine was forbidden to be eaten by the Mosaic law, and is regarded by the Jews as especially typical of the unclean animals. Other Eastern nations had similar opinions as to the use of pork. Pork contains less fibrine, albuminous and gelatinous matter than beef or mutton.

Porosity, the name given to a property possessed by all bodies, in consequence of which their molecules are not immediately contiguous to one another, but are separated by intervening spaces or pores.

Porphyr'io, a genus of birds of the rail family, including the *P. hyacinthinus* (purple or hyacinthine gallinule), a bird found

Porphyrio hyacinthinus (Purple Gallinule).

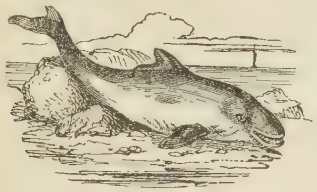
in Europe, Asia, and Africa, and remarkable for the structure of its beak and the length of its legs. It feeds on seeds and other hard substances, and lives in the neighbourhood of water, its long toes enabling it to run over the aquatic plants with great facility. It is about 18 inches long, of a beautiful blue colour, the bill and feet red.

Porphyry, originally the name given to a very hard stone, partaking of the nature of granite, susceptible of a fine polish, and consequently much used for sculpture. In the fine arts it is known as *Rosso Antiquo*, and by geologists as *Red Syenitic Porphyry*. It consists of a homogeneous felspathic base or matrix, having crystals of rose-coloured felspar, called oligoclase, with some plates of blackish hornblende, and grains of oxidized iron ore imbedded, giving to the mass a speckled complexion. It is of a red, or rather of a purple and white colour, more or less variegated, the shades being of all gradations from violet to a claret colour. Egypt and the East furnish this material in abundance. It also abounds in Minorca, where it is of a red lead colour, variegated with black, white, and green. Pale and red porphyry, variegated with black, white, and green, is found in separate nodules in Germany, England, and Ireland. The art of cutting porphyry as practised by the ancients appears to be now quite lost. In geology the term porphyry is applied to any unstratified or igneous rock in which detached crystals of felspar or some other mineral are diffused through a base of other mineral composition. Porphyry is known as felspar porphyry, claystone porphyry, porphyritic granite, and porphyritic greenstone. In America it is often associated with gold.

Porphyry (Porphyrios), a Greek philosopher of the Neo-Platonic school, celebrated as an antagonist of Christianity, born about 233 A.D. He studied under Longinus at Athens, and at the age of thirty placed himself under the teaching of Plotinus at Rome. About 268 he went to Sicily, where he is said to have written his treatise against the Christians, which was publicly burned by the Emperor Theodosius, and is only known from fragments in the authors who have refuted him. Porphyry recognized Christ as an eminent philosopher, but he charged the Christians with corrupting his doctrines. He was a voluminous writer, but few of his works are extant. The most important are his Lives of Plotinus and Pythagoras. Porphyry died about 304 or 306.

Porpoise, a genus of cetacean mammalia, belonging to the family Delphinidæ (dolphins, &c.). The common porpoise (*Phocæna communis*) is the smallest and most familiar of all Cetacea, and occurs plentifully off the British coasts and in the North

Sea. It attains an average length of 5 feet. The front of the head is convex in form, and has the spiracle or blow-hole in the middle line. The eyes and ears are small. The caudal fin is horizontal and flattened. The neck is very short. The fore limbs project from the body. No hind limbs are developed. The teeth are small with blunted crowns. The stomach is in three portions.



Porpoise (*Phocæna communis*).

No olfactory nerves exist. The porpoise feeds almost entirely on herrings and other fish, and herds or 'schools' of porpoises follow the herring-shoals, amongst which they prove very destructive. An allied species is the round-headed porpoise, or 'caaing whale' of the Shetlanders. These latter measure from 20 to 24 feet in length, and are hunted for the sake of the oil. See *Caaing Whale.*

Por'pora, Nicolò, Italian composer, was born at Naples about 1685, and was the favourite pupil of Scarlatti. His first opera, Ariana e Teseo, was brought out at Vienna, 1717. In 1722 he had composed five operas and an oratorio. In 1725 he went to Vienna, and subsequently paid professional visits to Rome, Venice, and Dresden. In 1729 a party in London, which was discontented with Handel, opened a second opera-house, and called Porpora to take the direction of it. Porpora was successful, and Handel after a heavy pecuniary loss gave up the theatre, and devoted himself to oratorio. Porpora afterwards returned to the Continent, and died in great poverty at Naples in 1767.

Porsen'na, or Por'sena, Lars, the king of the Etrurian city Clusium, according to the legend narrated by Livy, who received the Tarquins when they were expelled from Rome, and after in vain endeavouring to effect their restoration by negotiation, advanced with an army to Rome. He was checked by Horatius Cocles, who defended the bridge over the Tiber leading to Rome. Modern critics have held that Rome was completely conquered by him.

Porson, Richard, critic and classical scholar, professor of Greek in the University of Cambridge, was born in 1759, at East Ruston, in Norfolk, where his father was parish clerk; and died in London 1808. In 1777 he entered Trinity College, Cambridge, where he highly distinguished himself in classics, and in 1782 took the degree of B.A. and was chosen to a fellowship. This he resigned in 1792, since it could no longer be held by a layman, and Porson declined to take holy orders. Soon after he was unanimously elected Greek professor, a post which, however, brought him an income of only £40 a year. He edited and annotated several Greek works, especially four of the dramas of Euripides, and enjoyed the reputation of being one of the best Greek scholars and critics of the age, notwithstanding which he experienced little patronage, a circumstance partly attributable to his intemperate habits. In 1805 he was appointed librarian to the London Institution. He was familiar with English literature, and wrote for some of the chief periodicals of the day.

Port, a kind of wine. See *Port Wine.*

Port, a harbour or haven, or place where ships receive and discharge cargo. A *free port* is one at which the goods imported are exempted from the payment of any customs or duties, as long as they are not conveyed into the interior of the country.

Port, the name given to the left side of a ship (looking towards the prow), as distinguished from the starboard or right side. Formerly *larboard* was used instead of *port.*

Porta. See *Baccio della Porta.*

Port Adelaide, a seaport of S. Australia, the port of the city of Adelaide, with which it is connected by a railway of 7½ miles. It is on the estuary of the Torrens, which enters the Gulf of St. Vincent, and is the chief port of S. Australia. The harbour accommodation has been recently greatly improved, extensive wharves, piers, &c., have been provided, but the entrance is still partly obstructed by bars. The town has a custom-house, marine board offices, court-house, &c. Pop 5279.

Portadown', a market town, Ireland, in the county and 9 miles north-east of Armagh, on the Bann, which is navigable to vessels of 90 tons. Pop. 7850.

Portage, Columbia co., Wis., on Wisconsin River, at head of navigation, has several factories and mills and considerable trade. Pop. 1890, 5143.

Portage, a term applied in Canada to a break in a chain of water communication, over which goods, boats, &c., have to be carried, as from one lake, river, or canal to another; or, along the banks of rivers, round waterfalls, rapids, &c.

Portage la Prairie, a rising town of Canada, in Manitoba, on the Assiniboine, in a rich wheat-growing region. Pop. 3000.

Portal Circulation, a subordinate part of the venous circulation, belonging to the liver, in which the blood makes an additional circuit before it joins the rest of the venous blood. The term is also applied to an analogous system of vessels in the kidney.

Port Alfred, a seaport of Cape Colony, South Africa, at the mouth of the Kowie River, to the N.E. of Port Elizabeth. Extensive harbour works are in progress. Pop. 1000.

Portar'lington, a market town of Ireland, partly in King's and partly in Queen's County, on the Barrow, 44 miles W.S.W. from Dublin. A colony of French and Flemish Protestants was formerly planted there, and many of their descendants still survive. Pop. 2426.

Port Arthur, a town and harbour at the north-western extremity of Lake Superior, Ontario, Canada, and a station on the Canadian Pacific Railway. Mining and lumbering are the chief industries. Pop. 3000.

Port-au-Prince (por-tō-prans), capital of the Republic of Hayti, on the western side of the island, at the south-east extremity of the bay of the same name. It is built in a low and unhealthy spot, consists chiefly of wooden houses, and contains an ungainly palace, a senate-house, a Roman Catholic church, a custom-house, mint, an hospital, lyceum, &c. The chief exports are mahogany and red-wood, coffee, and cocoa-nuts. Pop. 40,000.

Port Chester, Westchester co., N. Y., on Long Island Sound. Pop. 1890, 5274.

Portcullis, a strong grating of timber or iron, resembling a harrow, made to slide in vertical grooves in the jambs of the entrance-gate of a fortified place, to protect the gate in case of assault.

Port Darwin, an inlet on the northern coast of Australia, the chief harbour of the Northern Territory of South Australia, about 2000 miles from Adelaide. The port town is Palmerston.

Port Durnford, a good harbour on the east coast of Equatorial Africa, in lat. 1° 13′ S., at the mouth of the Wabuski River.

Porte, Ottoman, or Sublime Porte, the common term for the Turkish government. The chief office of the Ottoman Empire is styled *Babi Ali*, lit. the High Gate, from the gate (*bab*) of the palace at which justice was administered; and the French translation of this term being *Sublime Porte*, hence the use of this word.

Port Elizabeth, a seaport in the east of Cape Colony, on Algoa Bay. It contains many fine buildings, including a town-house, custom-house, hospital, &c., and is the great emporium of trade for the eastern portion of the colony as well as for a great part of the interior, being the terminus of railways that connect it with Kimberley and other important inland towns. It is now a greater centre of trade than Cape Town, and the exports and imports amount to over £3,500,000. Pop. 1891, 23,266.

Porter, Anna Maria, was born about 1781. She produced a number of novels, which enjoyed considerable popularity in their day. Died in 1832.

Porter, David Dixon, naval officer, was born in Chester, Penna., in 1813. He entered the U. S. navy as midshipman in 1829. He served during the entire Mexican war, and was in every action on the coast. At the beginning of the civil war he was placed in command of the steam-frigate Powhatan. In command of a mortar fleet he rendered assistance in the reduction of Forts Jackson and St. Philip; likewise in the capture of Vicksburg and Arkansas Post. For these services he was made rear-admiral. In 1865 with General Terry captured Fort Fisher. In 1866 he was promoted vice-admiral, and in 1870 appointed admiral. He died Feb. 13, 1891.

Porter, Jane, was born at Durham in 1776. Her publications include Thaddeus of Warsaw and The Scottish Chiefs. Died at Bristol, 1850.

Porter, Noah, D.D., LL.D., an American philosopher and writer, born at Farmington, Conn., United States, in 1811. Graduating at Yale College in 1831, he was ordained pastor of the Congregational Church, New Milford, Conn., in 1836, and in 1843 settled at Springfield, Mass. Returning to Yale in 1846 as professor of metaphysics and moral philosophy, he was elected president in 1871, and continued to hold that position till 1886. Amongst his chief works are Historical Discourses, the Human Intellect, Books and Reading, the Science of Nature versus the Science of Man, The Elements of Intellectual

Philosophy, The Elements of Moral Science, Bishop George Berkeley, and Kant's Ethics. Dr. Porter also edited an edition of Webster's Dictionary. Died March 4, 1892.

Porter, Sir Robert Ker, artist and traveller, born at Durham about 1775, died at St. Petersburg 1842. He was brother to Jane and Anna Maria Porter, became a student at the Royal Academy, painted several large battle-pieces, and in 1804 was invited to Russia by the emperor, who made him his historical painter. In 1808 he joined the British forces under Sir John Moore, whom he accompanied to Spain. Subsequently he returned to Russia and married the Princess Sherbatoff. In 1813 he obtained the honour of knighthood. From 1817 to 1820 inclusive he was engaged in travelling through the East, and from 1826 to 1841 was British consul to Venezuela. Among his works are Travelling Sketches in Russia and Sweden; Letters from Portugal and Spain; Narrative of the Campaign in Russia; Travels in Georgia, Persia, and Armenia.

Port-Glasgow, a seaport of Scotland, in Renfrewshire, on the southern bank of the estuary of the Clyde above Greenock. Among the buildings are the town-house, court-house, and prison combined, forming a fine range of buildings, with a Doric portico and a handsome spire; there are also a handsome town-hall and a good custom-house. When the Clyde was deepened so as to enable large vessels to sail up to Glasgow, the trade of Port-Glasgow rapidly diminished. Recently, however, it has somewhat revived. The staple industries are ship-building and marine engineering; and there are manufactures of sail-cloth, ropes, &c. The burgh joins with Kilmarnock, Rutherglen, Dumbarton, and Renfrew in sending a member to parliament. Pop. 13,264.

Port Hamilton, for some time a coaling station of the British navy, consisting of three small islands, Sodo, Sunhodo, and Observatory Island, about 40 miles south of Corea, commanding the straits of that name leading from the China Seas to the Japanese Sea. The three islands inclose a large and commodious harbour. Pop. about 2000.

Port Hope, a town of Canada on the northern shore of Lake Ontario, 63 miles N.E. of Toronto by the Grand Trunk Railway. The town is beautifully situated at the base and on the declivity of the hills overlooking the lake. It has active industries, and a good trade in timber, grain, and flour. Pop. 1891, 5042.

Port Huron, a city of the United States, on the St. Clair river, Michigan, at the southern extremity of Lake Huron. It is the terminus of important railroads, and has an extensive lumber trade, ship-yards, saw, flour, and planing mills, &c. Pop. 1890, 13,543.

Portici (por'ti-chē), a town in Southern Italy, on the Gulf of Naples at the base of Vesuvius. It is about 5 miles east from the city of Naples, but is connected with it by the long village of S. Giovanni a Teduccio. (See plan at *Naples*.) It is delightfully situated, has many elegant villas, and is surrounded by fine country-seats. It possesses a royal palace, now the property of the municipality of Naples. An active fishery is carried on. Pop. 10,059.

Portico, in architecture, a kind of porch before the entrance of a building fronted with columns, and either projecting in front of the building or receding within it. Porticoes are styled tetrastyle, hexastyle, octostyle, decastyle, according as the columns number four, six, eight, or ten.

Portishead, familiarly Posset, a small town of England, in Somersetshire, on the Severn estuary, 10 miles by rail from Bristol, now a favourite watering-place. Pop. 2739.

Port Jackson, a beautiful and extensive inlet on the east coast of Australia in New South Wales, forming a well-sheltered harbour on the south shore of which Sydney stands. See *Sydney*.

Port Jervis, a town of the U. States, in Orange co., New York, beautifully situated at the confluence of the Neversink and Delaware, where the boundaries of New York, New Jersey, and Pennsylvania meet. Pop. 1890, 9327.

Portland, a seaport of the United States, in Maine, on a peninsula at the western extremity of Casco Bay, a picturesque and well-built city, with handsome public buildings, and abundance of trees in many of its streets. Locomotive cars, &c., are made; there are also ship-building yards, glass-works, potteries, and rope-walks; and the refining of petroleum and sugar is extensively carried on. The trade both maritime and inland is extensive, Portland being the terminus of important railways. The harbour is easy of access, capacious, safe, deep enough for the largest vessels, and

rarely obstructed with ice; hence it is a convenient winter port for traffic between Britain and Canada. The coasting trade is extensive, and many vessels are engaged in the fisheries. The principal exports are timber, fish, beef, butter, &c. Pop. 36,425.

Portland, the chief city of Oregon, United States, situated on the left bank of Willamette River, about 12 miles from its confluence with the Columbia. It is the terminus of the Northern Pacific Railway, and at the head of ship navigation, having regular steam communication with British Columbia and San Francisco. Pop. 46,385, or, including the suburban city of East Portland, 56,917.

Portland, a town of New Brunswick, really a suburb of St. John city, with which it has been recently united. Pop. 15,226.

Portland, Isle of, a peninsula, supposed to have been formerly an island, in the county of Dorset, 50 miles W.S.W. of Southampton, in the British Channel. It is attached to the mainland by a long ridge of shingle, called the Chesil Bank, and it consists chiefly of the well-known Portland stone (which see), which is chiefly worked by convicts, and is exported in large quantities. One of the most prominent objects in the island is the convict prison, situated on the top of a hill. It contains about 1500 convicts. The south extremity of the island is called the *Bill of Portland*, and between it and a bank called the Shambles is a dangerous current called the *Race of Portland*. See also *Portland Breakwater*.

Portland Beds, in geology, a division of the Upper Oolites occurring between the Purbeck Beds and the Kimmeridge Clay, consisting of beds of hard oolitic limestone and freestone interstratified with clays and resting on light-coloured sands which contain fossils, chiefly mollusca and fish, with a few reptiles. They are named from the rocks of the group forming the Isle of *Portland* in Dorsetshire, from whence they may be traced through Wiltshire as far as Oxfordshire.

Portland Breakwater, the greatest work of the kind in Britain, runs from the north-east shoulder of the Isle of Portland (which see) in a north-east direction, with a bend towards the English Channel, and forms a complete protection to a large expanse of water between it and Weymouth, thus forming an important harbour of refuge. It consists of a sea-wall 100 feet high from the bottom of the sea, 300 feet thick at the base, and narrowing to the summit, and has a length of 1⅝ mile, consisting of two portions, one connected with the shore, 1900 feet in length, and another of 6200 feet in length, separated from the former by an opening 400 feet wide, through which ships can pass straight to sea with a northerly wind. It is protected by two circular forts, the principal at the north end of the longer portion. The work, which was carried out by government, occupied a period of nearly twenty-five years, ending with 1872, and cost £1,033,600, exclusive of convict labour. It is constructed of Portland stone.

Portland Cement, a well-known cement, so called from its resemblance in colour to Portland stone. It is made from chalk and gault clay in definite proportions. These materials are intimately mixed with water, and formed into a sludge. This is dried, and when caked is roasted in a kiln till it becomes hard. It is afterwards ground to a fine powder, in which state it is ready for market. This cement is much employed along with gravel or shivers for making artificial stone. A month after it is set it forms a substance so hard as to emit a sound when struck.

Portland, steamship, sailing between Boston, Mass., and Portland, Maine, went down off Highland Light, Dec. 27, 1898, with 148 souls on board in a terrific tempest that swept the whole of the New England coast, 200 other lives being lost in the same storm.

Portland Stone is an oolitic limestone occurring in great abundance in the Isle of Portland, England. (See *Portland*.)

Portland (or Barberini) **Vase**, a celebrated ancient cinerary urn or vase, of the 3d century after Christ, found in the tomb of the Emperor Alexander Severus. It is of transparent dark-blue glass, coated with opaque white glass, which has been cut down in the manner of a cameo, so as to give on each side groups of figures delicately executed in relief, representing the marriage of Peleus and Thetis. In 1810 the Duke of Portland, its owner, allowed it to be placed in the British Museum, where it remained intact till the year 1845, when it was maliciously broken. The pieces were carefully collected and very successfully reunited.

Portlaw, a village in Ireland, county of Waterford, 11 miles W.N.W. of the town of Waterford, noted for a large cotton manufactory. Pop. 1891.

Port-Louis, the capital of the island of Mauritius, on the north-west coast, beauti-

fully situated in a cove formed by a series of basaltic hills, partially wooded, varying in height from 1058 to 2639 feet. The site is rather unhealthy. The streets, though rather narrow, are laid out at right angles and adorned with acacias. A mountain stream traverses the town, and an open space like a race-course lies behind it. There are barracks, theatre, public library, botanic garden, hospital, &c., but no buildings of architectural importance; the town and harbour are protected by batteries. Pop. 1891, 62,046.

Port-Lyttelton. See *Lyttelton.*

Port-Mahon (mȧ-ōn′), the capital of the island of Minorca, situated on a narrow inlet in the S.E. of the island. The harbour, protected by three forts, is one of the finest in the Mediterranean, and is capable of accommodating a large fleet of ships of the heaviest tonnage. The town is well built, and still bears evidences of the British occupation which lasted for great part of the last century. Pop. 15,842.

Port-Moody, a harbour at the head of Burrard Inlet, British Columbia, Canada. It was intended for the terminus of the Canadian-Pacific Railway, but has been abandoned for Vancouver, at the entrance to Burrard Inlet.

Port-Natal′. See *Durban.*

Porto. Same as *Oporto.*

Porto-Alegre (ȧ-lā′gre), a town in Brazil, capital of the province of Rio Grande do Sul, near the north-west extremity of Lake Patos, 150 miles N.N.W. of Rio-Grande. It is well and regularly built. The harbour is much visited by merchant vessels, and it has an important trade. Pop. 30,000.

Portobello, a parliamentary burgh (Leith district) of Scotland, 3 miles east of the city of Edinburgh on the Firth of Forth, much frequented as a summer resort. The beach is well adapted for bathing; the promenade is nearly a mile long, and the pier 1250 feet long and 22 feet broad. Pop. 6926.

Porto-Bello, a seaport of Colombia, on the Caribbean Sea, 40 miles N.N.W. of Panamá. Formerly of some importance, it is now a poor and miserable place, although its fine harbour still attracts some trade.

Porto-Cabello, a town of Venezuela, on the Caribbean Sea. It has a capacious and safe harbour. Pop. 8486.

Porto-Ferrajo (fer-rä′yō), chief town of the island of Elba, on the north coast. Pop. 3737. Napoleon I. resided here from May 5, 1814, to February 26, 1815.

Port of Spain, the chief town of the island of Trinidad. It is a pleasant, well-built town; has two cathedrals, government house, town-hall, court-house, theatre, barracks, &c. It is a railway terminus, and at present goods are landed in flats from the ships in the roadstead, but a pier is projected. Pop., including the suburbs of

Laventville, Belmont, and **St. Anne's,** 1891, 33,782.

Porto-Maurizio, a town in Italy, 40 miles E.N.E. of Nice, on the south-western shore of the Gulf of Genoa. It has a trade in olive-oil. Pop. 7286.

Portono′vo, a seaport in Hindustan, in S. Arcot district, Madras Presidency, formerly a large and wealthy town, but now comparatively poor and depopulated. Pop. 7823.

Porto-Rico (Sp., *Puerto Rico*), formerly one of the Spanish W. I. Islands, the fourth in size of the Antilles, east of Hayti; area, with subordinate isles, 3596 square miles. The island is beautiful and very fertile. A range of mountains, covered with wood, traverses it from east to west, averaging about 1500 feet in height, but with one peak 3678 feet high. In the interior are extensive savannahs; and along the coast tracts of fertile land, from 5 to 10 miles wide. The streams are numerous, and some of the rivers can be ascended by ships to the foot of the mountains. There are numerous bays and creeks. The chief harbour is that of the capital, San Juan de Porto-Rico; others are Mayaguez, Ponce, and Are-

cibo. The climate is rather healthy except during the rainy season (Sept.—March). Gold is found in the mountain streams. Copper, iron, lead, and coal have also been found; and there are salines or salt ponds. The chief products are sugar, rum, molasses, coffee, cotton, tobacco, hides, live-stock, dye-woods, timber, rice, &c. The island was discovered by Columbus in 1493, and was settled by the Spaniards in 1510, who soon exterminated the natives. Invaded by the United States, July, 1898, and ceded by Spain to that government by the peace protocol, the U. S. military authorities taking formal possession on Oct. 18, 1898. Pop. 810,394.

Porto-Rico, SAN JUAN DE, the capital and principal seaport of the above island, on its north coast, stands upon a small island connected with the mainland by a bridge, is surrounded by strong fortifications, and is the seat of the government. Population 23,414.

Porto Santo, a small island about 40 miles north-east of the island of Madeira.

Port-Patrick, a seaport in Wigtownshire, Scotland, on the Irish Sea, the nearest port in Britain to Ireland, the distance being only 21 miles. A submarine electric telegraph connects Port-Patrick with Donaghadee in Ireland. Pop. 591.

Port-Phillip, Australia. See *Melbourne.*

Portree', a village of Scotland, on a small bay on the east shore of the island of Skye. It has a good harbour, which is regularly visited by Glasgow steamers. Pop. 893.

Port Richmond, Richmond co., N. Y., 8 m. S. W. of New York. Pop. 1890, 6290.

Port-Royal, a fortified town on the south-east coast of Jamaica, on a tongue of land, forming the south side of the harbour of Kingston. Its harbour is a station for British ships of war, and it contains the naval arsenal, hospital, &c. It has been often damaged by earthquakes. Pop. 14,000.

Port-Royal, a Cistercian convent in France, which played an important part in the Jansenist controversy. It was situated near Chevreuse (department of Seine-et-Oise), about 15 miles S.W. of Paris, and was founded in 1204 by Matthieu de Montmorency, under the rule of St. Bernard. Port-Royal, like many other religious houses, had fallen into degenerate habits, when in 1609 the abbess Jacqueline-Marie-Angélique-Arnauld undertook its reform. The number of nuns increased considerably under her rule, and in 1625 they amounted to eighty. The building thus became too small, and the insalubrity of the situation induced them to seek another site. The mother of the abbess purchased the house of Cluny, in the Faubourg Saint Jacques, Paris, to which a body of the nuns removed. The two sections of the convent were now distinguished as Port-Royal des Champs and Port-Royal de Paris. About 1636 a group of eminent literary men of decided religious tendencies took up their residence at Les Granges, near Port-Royal des Champs, where they devoted themselves to religious exercises, the education of youth, &c. These were regarded as forming a joint community with the nuns of Port-Royal, among whom most of them had relatives. Among the number were Antoine Arnauld, Arnauld d'Antilly, Lemaistre de Sacy and his two brothers, all relatives of the abbess; Nicolle, and subsequently Pascal, whose sister Jacqueline was at Port-Royal. The educational institution, thus founded, which flourished till 1660, became a powerful rival to the institution of the Jesuits, and as the founders adopted the views of Jansenius (see *Jansenists*), subsequently condemned by the pope, a formidable quarrel ensued, in which the Port-Royalist nuns, siding with their male friends, became subject to the relentless persecution of the Jesuits, which culminated in the complete subversion of their institution. Port-Royal des Champs was finally suppressed by a bull of Pope Clement II. (1709), and its property given to Port-Royal de Paris. The latter continued its existence to the revolution, when its house was converted into a prison, and subsequently (1814) into a maternity hospital.

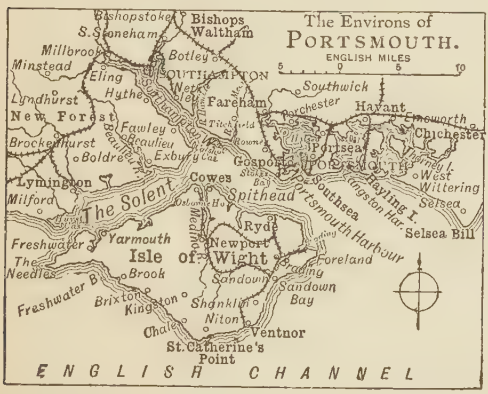
Portrush', a small seaport in the north of Ireland, 5 miles north of Coleraine; much resorted to for sea-bathing. It is connected with the Giant's Causeway by an electric tramway. Pop. 1196.

Port Said, a town of Egypt, on the Mediterranean, at the northern entrance of the Suez Canal. It was begun simultaneously with the canal in 1859, being designed for its terminal port. There is an outer harbour formed by two piers jutting out into the sea, each terminated by a small lighthouse. This admits large ocean steamers, which thus sail into the inner harbour and from it into the canal. Near the entrance to the inner harbour is a lofty lighthouse with a powerful light. Pop. 16,560.

Portsea, an island of Hampshire, England, about 5 miles long (N. to S.) by about

3 broad. It comprises the towns of Portsmouth and Portsea, and several villages, and is connected with the mainland by a bridge at its north end. See *Portsmouth*.

Portsmouth, the principal station of the British navy, a seaport, municipal and parliamentary borough of England, in Hampshire, on the south-west extremity of the island of Portsea. It consists of the four districts, Portsmouth proper, Portsea, Landport, and Southsea. Portsmouth proper is a garrison town. The best street is the High Street, which contains the principal shops, hotels, and places of business. Portsea is the seat of the naval dockyard; Landport is an artisan quarter; and Southsea on the east side of the town of Portsmouth is a favourite sea-side resort, and commands fine views of Spithead and the Isle of Wight. Southsea Castle with its adjacent earthworks, the batteries of the Gosport side, and the circular forts built out in the roadstead, command the entrance to Portsmouth Harbour. The island of Portsea, which is separated from the mainland by a narrow creek called Portsbridge Canal, is bounded on the east by Langston Harbour, on the west by Portsmouth Harbour, and on the south by Spithead and the Harbour Channel. The royal dockyard covers an area of about 500 acres, and is considered the largest and most magnificent establishment of the kind in the world. Inclosed by a wall of 14 feet high, and entered by a lofty gateway, it includes vast store-houses, containing all the materials requisite for naval architecture; machine shops, with all modern appliances; extensive slips and docks, in which the largest ships of the navy are built or repaired; ranges of handsome residences for the officials, and a Royal Naval College, with accommodation for seventy students. Outside the dockyard an area of 14 acres contains the gun-wharf, where vast numbers of guns and other ordnance stores are kept, and an armoury with 25,000 stand of small arms. Portsmouth has no manufactures of any consequence, except those immediately connected with its naval establishments, and a few large breweries. Its trade, both coasting and foreign, is of considerable extent.



Of late years an extensive and systematic series of fortifications has been under construction for the complete defence of Portsmouth. They extend along a curve of about 1½ mile at the north side of Portsea Island. A series of hills, 4 miles to the north of Portsmouth, and commanding its front to the sea, are well fortified with strong forts. On the Gosport side a line of forts extends for 4 miles. The municipal and parliamentary borough includes nearly the whole of the island of Portsea. It sends two members to the House of Commons. Pop. 1891, 159,255.

Portsmouth, a seaport of the United States, in Rockingham county, New Hampshire, on the right bank of the Piscataqua, 3 miles above its mouth in the Atlantic, 50 miles north by east of Boston. It has long been noted for its skill in naval architecture, and for maritime enterprise. It is the seat of a government navy-yard, and the harbour is one of the safest and most commodious in the United States. Pop. 1890, 9827.

Portsmouth, a seaport city of the United States, in Norfolk county, Virginia, at the mouth of the Elizabeth, 88 miles E.S.E. Richmond; has a military academy, and a harbour allowing ships of the heaviest burden to come to the wharfs. At Gosport, a suburb, are a navy-yard, dry dock, and naval hospital. Pop. 1890, 13,268.

Portsmouth, a city in the United States, in Scioto county, Ohio, on the Ohio; has extensive iron manufactures. Pop. 12,394.

Port-Stanley, port and capital of the Falkland Islands, on Port William Inlet, on the N.E. coast of East Falkland. It exports wool, hides, seal-fur, &c. Pop. 900.

Port Talbot. See *Aberavon*.

Por'tugal, a kingdom in the south-west of Europe, forming the west part of the Iberian Peninsula; bounded east and north by Spain, and west and south by the Atlantic; greatest length, north to south, 345 miles; greatest breadth, 140 miles. It is divided into seven provinces: Minho, Trazos-Montes, Beira, Estremadura, Alemtejo, and Algarve, with a total area of 34,462 sq. miles, and a population of 4,306,554. Add to these the Azores (921 square miles; population, 269,401), and Madeira (315 square miles; population, 132,223), which gives a grand total of 35,698 square miles, and a population of 4,708,178. The colonial possessions of Portugal consists of—in Asia—Goa, Salsette, Damaun, and Diu, all in Hindustan, Macao in China, and possessions in the Indian Archipelago, having together an area estimated at 7923 square miles, and a population estimated at 847,503; in Africa—Cape Verd, St. Thomas, and Prince's Islands, the Guinea settlements, Angola (Congo, Benguela, Mossamedes), Mozambique and dependencies, with an aggregate area of 697,335 square miles, and an estimated population of 4,141,448. The total area of the Portuguese possessions therefore amounts to 909,824 square miles, the population 5,518,000.

Physical Features.—Portugal is only partially separated from Spain by natural boundaries. Its shape is nearly that of a parallelogram. The coast-line, of great length in proportion to the extent of the whole surface, runs from the north in a general s.s.w. direction till it reaches Cape St. Vincent, where it suddenly turns east. It is occasionally bold, and rises to a great height; but the far greater part is low and marshy, and not unfrequently lined by sands and reefs, which make the navigation dangerous. The only harbours of importance, either from their excellence or the trade carried on at them, are those of Lisbon, Oporto, Setubal, Faro, Figueira, Aveiro, and Vianna. The interior is generally mountainous, a number of ranges stretching across the country, forming a succession of independent river basins, while their ramifications form the water-sheds of numerous subsidiary streams, and inclose many beautiful valleys. The loftiest range is the Serra d'Estrella, a continuation of the central chain stretching across Spain, which attains the height of 7524 feet. The nucleus of the mountains is usually granite, especially in the north and middle. The minerals include lead, iron, copper, manganese, cobalt, bismuth, antimony, marble, slate, salt, saltpetre, lithographic stones, mill-stones, and porcelain earth. No rivers of importance take their rise in Portugal. The Minho in the north, the Douro, and the Tagus all flow from east to west. The Guadiana is the only large river which flows mainly south. Portugal can only claim as peculiarly her own the Vouga, Mondego, and Sado.

Climate and Productions.—The climate is greatly modified by the proximity of the sea and the height of the mountains. In general the winter is short and mild, and in some places never completely interrupts the course of vegetation. Early in February vegetation is in full vigour; during the month of July the heat is often extreme, and the country assumes, particularly in its lower levels, a very parched appearance. The drought generally continues into September; then the rains begin, and a second spring unfolds. Winter begins at the end of November. In the mountainous districts the loftier summits obtain a covering of snow, which they retain for months; but south of the Douro, and at a moderate elevation, snow does not lie long. The mean annual temperature of Lisbon is about 56°. Few countries have a more varied flora than Portugal. The number of species has been estimated to exceed 4000, and of these more than 3000 are phanerogamous. Many of the mountains are clothed with forest trees, among which the common oak and the cork oak are conspicuous. In the central provinces chestnuts are prevalent; in the south both the date and the American aloe are found; while in the warmer districts the orange, lemon, and olive are cultivated with success. The mulberry affords food for the silkworm, and a good deal of excellent silk is produced. The vine, too, is cultivated, and large quantities of wine are sent to Britain (especially port wine), and also to France, being in the latter country converted into Bordeaux wine. Agriculture generally, however, is at a low ebb, and in ordinary years Portugal fails to raise cereals sufficient to meet its own consumption. Among domestic animals raised are mules of a superior breed, sheep, goats, and hogs; but up to a very few years ago little attention was paid to their improvement. In consequence of recent reforms, however, there has been a marked improvement in most branches of industry. More horned cattle have been raised and of a better

quality, and live-stock now figures with timber and wine among the chief exports. The fisheries, so long neglected, have also been revived in recent years.

Manufactures, Industry, &c.—Manufactures are of limited amount, although they have been increasing of late years. They embrace woollens, cottons, silks, earthenware and porcelain, soap, paper, iron goods, hats, &c. The principal exports are wine, cork, cattle, timber, olive-oil, fruits, iron and copper pyrites, and wool; the principal imports are cereals, salt provisions, colonial produce, woollen, cotton, linen, and silk tissues, iron, steel, and other metals, and coal. In 1891 the total amount of imports was 50,024,000 milreis; the exports were 31,872,000 milreis. The trade is mostly with Great Britain, France, and Brazil. Cotton goods to the value of nearly £1,000,000 are annually exported from Great Britain to Portugal. Accounts are kept in *reis, milreis* or 1000 reis, and *conto de reis* or 1,000,000 reis. The value of the rea (or *real*) is so minute that the milreis is worth only about 4*s.* 4½*d.* The French metric system of weights and measures was introduced into Portugal between 1860 and 1863.

Government, &c.—The crown is hereditary both in the male and female line. The constitution recognizes four powers in the state —the legislative, executive, judicial, and moderating. The last is vested in the sovereign. There are two chambers, the Chamber of Peers and the Chamber of Deputies. In 1885 a law was passed abolishing hereditary peerages by a gradual process. All laws relating to the army and taxation must originate in the chamber of deputies. While the established religion is the Roman Catholic, other religions are tolerated. Conventual establishments were suppressed in 1834. Education, under a distinct ministry, is compulsory; but the law is not enforced, and the general state of education is low. The revenue for 1892–93 estimated at 46,724,159 milreis; expenditure, 48,018,961 milreis. The revenue has been almost constantly deficient for more than thirty years; the national debt is now 324,018,828 milreis. The army, consisting of 30,000 men on the peace footing, is raised both by conscription and enlistment. The navy numbers (1892) 29 steamers with 103 guns, 17 gun-boats, 4 coast-guard ships, 5 torpedo boats, and 3 training ships.

History.—The Phœnicians, Carthaginians, and Greeks early traded to this part of the peninsula, the original inhabitants of which are spoken of as Lusitanians, the country being called Lusitania. It was afterwards conquered by the Romans, who introduced into it their own civilization. The country was afterwards inundated by Alans, Suevi, Goths, and Vandals, and in the 8th century (712) was conquered by the Saracens. When the Spaniards finally wrested the country between the Minho and the Douro from Moorish hands, they placed counts or governors over this region. Henry the Younger of Burgundy, grandson of Hugh Capet, came into Spain about 1090, to seek his fortune in the wars against the Moors. Alphonso VI. gave him the hand of his daughter, and appointed him (1095) count and governor of the provinces Entre Douro e Minho, Traz-os-Montes, part of Beira, &c. The count, who owed feudal services to the Castilian kings, was permitted to hold in his own right whatever conquests he should make from the Moors beyond the Tagus (1112). Henry's son, Alphonso I., defeated Alphonso, king of Castile, in 1137, and made himself independent. In 1139 he gained the brilliant victory of Ourique over the Moors, and was saluted on the field King of Portugal. The cortes convened by Alphonso in 1143 at Lamego confirmed him in the royal title, and in 1181 gave to the kingdom a code of laws and a constitution. Alphonso extended his dominions to the borders of Algarve, and took Santarem in 1143. The capture of Lisbon (1147) which was effected by the aid of some English Crusaders and others, was one of the most brilliant events of his warlike life. The succeeding reigns from Alphonso I. to Dionysius (1279) are noteworthy chiefly for the conquest of Algarve (1251) and a conflict with the pope, who several times put the kingdom under interdict. Dionysius's wise encouragement of commerce, agriculture, manufactures, and navigation laid the foundation of the future greatness of Portugal. He liberally patronized learning, and founded a university at Lisbon, transferred in 1308 to Coimbra. By these and other acts of a wise and beneficent administration he earned the title of *father of his country.* He was succeeded by Alphonso IV., who in conjunction with Alphonso II. of Castile defeated the Moors at Salado in 1340. He murdered Inez de Castro, the wife of his son Pedro (1355) (see *Inez de Castro*), who succeeded him. Dying in 1367, Pedro I. was succeeded by Ferdinand, on whose death in 1383 the

male line of the Burgundian princes became extinct. His daughter Beatrice, wife of the King of Castile, should have succeeded him; but the Portuguese were so averse to a connection with Castile that John I., natural son of Pedro, grand-master of the order of Avis (founded in 1162), was saluted king by the estates. In 1415 he took Ceuta, on the African coast, the first of a series of enterprises which resulted in those great expeditions of discovery on which the renown of Portugal rests. In this reign were founded the first Portuguese colonies, Porto Santo (1418), Madeira (1420), the Azores (1433), and those on the Gold Coast. The reigns of his son Edward (1433–38) and his grandson Alphonso V. were less brilliant than that of John I.; but the latter was surpassed by that of John II. (1481–95), perhaps the ablest of Portugal rulers. In his reign began a violent struggle with the nobility, whose power had become very great under his indulgent predecessors. The expeditions of discovery were continued with ardour and scientific method. Bartolommeo Diaz doubled the Cape of Good Hope in 1487, and Vasco da Gama reached India in 1498. In 1500 Cabral took possession of Brazil. (See *Colony.*) While these great events were still in progress John II. was succeeded by his cousin Emanuel (1495–1521). The conquests of Albuquerque and Almeida made him master of numerous possessions in the islands and mainland of India, and in 1518 Lope de Soares opened a commerce with China. Emanuel ruled from Babelmandeb to the Straits of Malacca, and the power of Portugal had now reached its height. In the reign of John III., son of Emanuel (1521–57), Indian discoveries and commerce were still further extended; but the rapid accumulation of wealth through the importation of the precious metals, and the monopoly of the commerce between Europe and India, proved disadvantageous to home industry. The wisdom which had hitherto so largely guided the counsels of the kings of Portugal now seemed to forsake them. The Inquisition was introduced (1536), and the Jesuits were admitted (1540). Sebastian, the grandson of John III., who had introduced the Jesuits, having had his mind inflamed by them against the Moors of Africa, lost his life in the battle against these infidels (1578), and left his throne to the disputes of rival candidates, of whom the most powerful, Philip II. of Spain, obtained possession of the kingdom by the victory of Alcantara. The Spanish yoke was grievous to the Portuguese, and many efforts were made to break it; but the power of Philip was too great to be shaken. Portugal continued under the dominion of Spain till 1640, and her vast colonial possessions were united to the already splendid acquisitions of her rival. But these now began to fall into the hands of the Dutch, who, being provoked by hostile measures of Philip, attacked the Portuguese as well as the Spanish possessions both in India and America. They deprived the Portuguese of the Moluccas, of their settlements in Guinea, of Malacca, and of Ceylon. They also acquired about half of Brazil, which, after the re-establishment of Portuguese independence, they restored for a pecuniary compensation. In 1640, by a successful revolt of the nobles, Portugal recovered her independence, and John IV., duke of Braganza, reigned till 1656, when he was succeeded by Alphonso VI. Alphonso ceded Tangier and Bombay to England as the dowry of his daughter, who became the queen of Charles II. Pedro II., who deposed Alphonso VI., concluded a treaty with Spain (1668), by which the independence of the country was acknowledged. During the long reign of John V. (1706–50) some vigour was exerted in regard to foreign relations, while under his son and successor Joseph I. (1750–77) the Marquis of Pombal, a vigorous reformer such as Portugal required, administered the government. On the accession of Maria Francisca Isabella, eldest daughter of Joseph, in 1777, the power was in the hands of an ignorant nobility and a not less ignorant clergy. In 1792, on account of the sickness of the queen, Juan Maria José, prince of Brazil (the title of the prince-royal until 1816), was declared regent. His connections with England involved him in war with Napoleon; Portugal was occupied by a French force under Junot, and the royal family fled to Brazil. In 1808 a British force was landed under Wellington, and after some hard fighting the decisive battle of Vimeira took place (August 21), which was followed by the Convention of Cintra and the evacuation of the country by the French. The French soon returned, however; but the operations of Wellington, and in particular the strength of his position within the lines of Torres Vedras, forced them to retire. The Portuguese now took an active part in the war for Spanish independence. On the death of Maria in 1816, John VI.

ascended the throne of Portugal and Brazil, in which latter country he still continued to reside. The absence of the court was viewed with dislike by the nation, and the general feeling required some fundamental changes in the government. A revolution in favour of constitutional government was effected without bloodshed in 1820, and the king invited to return home, which he now did. In 1822 Brazil threw off the yoke of Portugal, and proclaimed Dom Pedro, son of John VI., emperor. John VI. died in 1826, having named the Infanta Isabella Maria regent. She governed in the name of the Emperor of Brazil, Dom Pedro IV. of Portugal, who granted a new constitution, modelled on the French, in 1826. In this year he abdicated the Portuguese throne in favour of his daughter Maria da Gloria, imposing on her the condition of marrying her uncle Dom Miguel, who was intrusted with the government as regent; but the absolutist party in Portugal set up the claim of Dom Miguel to an unlimited sovereignty, and a revolution in his favour placed him on the throne in 1828. In 1831 Dom Pedro resigned the Brazilian crown, and returning to Europe succeeded in overthrowing Dom Miguel, and restoring the crown to Maria in 1833, dying himself in 1834. In 1836 a successful revolution took place in favour of the restoration of the constitution of 1820, and in 1842 another in favour of that of 1826. Maria died in 1853. Her husband, Ferdinand of Saxe-Coburg (Dom Ferdinand II.), became regent for his and her son, Pedro V., who himself took the reins of government in 1855. Pedro died in 1861, and was succeeded by his brother, Louis I. Louis died in 1889, and was succeeded by his son, Carlos I. During these latter reigns the state of Portugal has generally been fairly prosperous and progressive. The relations between Britain and Portugal have generally been very friendly, but Portuguese encroachments on territory under British protection in South-east Africa provoked an emphatic protest from Britain in 1889–90, and a rupture was even threatened for a time.

Language and Literature.—The differences between Portuguese and Spanish languages are of comparatively modern origin, the two languages being very nearly alike in the time of Alphonso I. The dialect of Spanish spoken in Portugal at the beginning of the monarchy was the Galician, which was also that of the court of Leon; but that court subsequently adopted the Castilian, which became the dominant language of Spain. The decline of the Galician dialect in Spain and the formation of the Portuguese language finally determined the separation of Spanish and Portuguese, and from cognate dialects made them distinct languages. Portuguese is considered to have less dignity than the Spanish, but is superior to it in flexibility. In some points of pronunciation it more resembles French than Spanish. It is also the language of Brazil. The oldest monuments of Portuguese literature do not go back further than the 12th and 13th centuries, and the native literature could then boast of nothing more than popular songs. The first Portuguese collection of poetry (*cancioneiro*) was made by King Dionysius, and was published under the title of Cancioneiro del Rey Dom Diniz. Some poems on the death of his wife are attributed to Pedro I., husband of Inez de Castro. The sons and grandsons of John I. were poets and patrons of the troubadours. Sà de Miranda marks the transition from the 15th to the 16th century and the separation of the Portuguese from the other Spanish dialects and from the language of the troubadours. The 16th century is the classic era of Portuguese literature. The chief names are Sà de Miranda, Antonio Ferreira, Camoens, Diego Bernardes, Andrade Caminha, and Alvares do Oriente. The principal epic and the greatest poem in the Portuguese literature, almost the only one which has acquired a European reputation, is Os Lusiadas (The Portuguese) of Camoens (1524–80), which has placed its writer in the rank of the few great poets of the highest class whose genius is universally recognized. After Camoens as an epic writer comes Cortereal, who has celebrated the siege of Diù and the shipwreck of Sepulveda. Vasco de Lobeiro, Francisco Moraes, and Bernardim Ribeiro are among the leading romance writers. The drama also began to be cultivated in the 16th century. Sà de Miranda studied and imitated Plautus. Ferreira composed the first regular tragedy, Inez de Castro. Camoens wrote several theatrical pieces, among which are Amphitryon and Seleucus. Barros, also a romance writer, wrote a History of the Conquest of India. The Commentaries of Alphonso d'Albuquerque, by a nephew of the conqueror; the Chronicle of King Manuel and of Prince John, by Damian de Goes; the History of the Discovery and Conquest of the Indies,

by Lopès de Castanheda; the Chronicle of King Sebastian, by Diego Bernardo Cruz, are all works of merit. By the opening of the 17th century Portugal's literary greatness had been succeeded by one of great activity, though of little real power. A crowd of epics were stimulated into being by the success of the Lusiad. During this period the native drama became almost extinct, being overshadowed by the Spanish. In the 18th century the influence of the French writers of the age of Louis XIV. so completely dominated Portuguese literature that it became almost entirely imitative. Towards the close of this century two writers appeared who have formed schools, Francisco Manoel do Nascimento (1734–1829), an elegant lyrist, and Barbosa du Bocage, who introduced an affected and hyperbolical style of writing. Among more recent poets possessing some claim to originality may be mentioned Mouzinho de Albuquerque, Feliciano Castilho, Herculano de Carvalho, Almeida Garrett, and Thomaz Ribeiro; among novelists are Carvalho, Garrett, Julio Diniz, and Rebello de Silva. Through the efforts of these and others Portuguese literature has again begun to assume an aspect of native vigour. In art Portugal has never distinguished herself.

Portuguese Man-of-war, the popular name of certain marine animals, allied to the Medusidæ or jelly-fishes, and included in the class Hydrozoa. See *Physalia*.

Portula'ceæ, or PURSLANES, a small nat. order of polypetalous exogens, consisting of annual, perennial, herbaceous, or shrubby plants, occurring in all the hotter or milder parts of the world. The only species of any importance is *Portulăca oleracĕa*, or common purslane, which is a fleshy prostrate annual, sometimes used in salads. It is naturalized in most of the warmer parts of the world, and is often a troublesome weed.

Portum'nus, or PORTU'NUS, the Roman god of harbours. The *Portumnalia* were yearly celebrated in his honour.

Port Victor, a seaport and sea-side resort on the shores of Victor Harbour, a small bight of Encounter Bay, S. Australia, 64 miles south of Adelaide. Extensive harbour works have recently been executed. Pop. 1097.

Port Victoria, the capital of the Seychelles, in the island of Mahé. See *Mahé*.

Port Wine is a very strong, full-flavoured wine produced in the upper valley of the Douro, Portugal, and has its name from the place of shipment, Oporto. It is slightly astringent, and has a colour varying from pink to red. It requires three or four years to mature, and with age becomes tawny; it receives a certain proportion of spirit to hasten the process of preparation. The vintage begins early in September and extends into October. The port wine trade was established in 1678, chiefly to supply Britain. The total annual production is put at from 110,000 to 120,000 pipes, of which at present 40,000 are on an average exported. Since 1876 the vineyards of the Douro have suffered greatly from the phylloxera. Large quantities of artificial port are made, particularly in the United Sates.

Poseidōn (po-sī'dōn), the Greek god of the sea, identified by the Romans with the Italian deity Neptunus. A son of Kronos and Rhea, and hence a brother of Zeus, Hēra, and Dēmētēr, he was regarded as only inferior in power to Zeus. His usual residence was in the depths of the sea near Ægæ, in Eubœa, and the attributes ascribed and most of the myths regarding him have reference to the phenomena of the sea. The horse, and more particularly the war-horse, was sacred to Poseidōn, and one of the symbols of his power. During the Trojan war Poseidōn was the constant enemy of Troy, and after its close he is described as thwarting the return of Ulysses to his home for his having killed Polyphēmus, a son of the god. Poseidōn was married to Amphitritē. His worship was common throughout Greece and the Greek colonies, but especially prevailed in the maritime towns. The Isthmian games were held in his honour. In works of art Poseidōn is represented with features resembling those of Zeus, and often bears the trident in his right hand. A common representation of him is as drawn in his chariot over the surface of the sea by hippocamps (monsters like horses in front and fishes behind) or other fabulous animals.

Posen, a fortified town in Prussia, capital of the province of the same name and an archbishop's see, stands on the Warthe, 149 miles east by south of Berlin. It is surrounded by two lines of forts, is built with considerable regularity, has generally fine wide streets, and numerous squares or open spaces. The most noteworthy public buildings are the cathedral, in the Gothic style (1775), the town parish church, a fine building in the Italian style, both Roman Catholic; the town-house (1508), with a lofty tower; the Raczynski Library; the muni-

cipal archive building, &c. The manufactures consist chiefly of agricultural machines, manures, woollen and linen tissues, carriages, leather, lacquerware, &c. There are also breweries and distilleries. Pop. 68,315.— The province is bounded by West Prussia, Russian Poland, Silesia, and Brandenburg; area, 11,178 sq. miles. The surface is flat, and extensively occupied by lakes and marshes. A small portion on the north-east belongs to the basin of the Vistula; all the rest to the basin of the Oder. The soil is mostly of a light and sandy character, yielding grain, millet, flax, hemp, tobacco, and hops. Forests occupy 20 per cent of the surface. The inhabitants include many Germans, especially in the towns, but considerably more than half are Poles, Posen being one of the acquisitions which Prussia made by the dismemberment of Poland. It is divided into the governments of Posen and Bromberg. Pop. 1890, 1,751,642.

Poses Plastiques, or TABLEAUX VIVANTS, imitations of pictures by living persons taking the place of those depicted.

Posidonius, a Stoic philosopher, born in Syria, about 135 B.C. He settled as a teacher at Rhodes, whence he is called the Rhodian. The most distinguished Romans were his scholars, and Cicero was initiated by him into the Stoic philosophy. Removing to Rome in 51 B.C., he died not long after. In his physical investigations he was more a follower of Aristotle than of the Stoic school.

Posili'po, an eminence which bounds the city of Naples on the west. It is traversed by a tunnel called the Grotto of Posilipo, 2244 feet long, from 21 to 32 feet wide, with a height varying from 25 to 69 feet, through which runs the road to Pozzuoli. This tunnel is remarkable for its antiquity, being constructed in the reign of Augustus. A second tunnel has recently been constructed for the tramway from Naples to Pozzuoli.

Positive, in photography, a picture obtained by printing from a *negative*, in which the lights and shades are rendered as they are in nature. See *Photography*.

Positive Philosophy, or POSITIVISM, is the name given by Auguste Comte to the philosophical and religious system promulgated by him (chiefly in his Cours de Philosophie Positive, 1830–42, and his posthumous Essays on Religion). The distinguishing idea which lies at the root of this twofold system is the conception that the anomalies of our social system cannot be reformed until the theories upon which it is shaped have been brought into complete harmony with science. The leading ideas of Comte's philosophy are (1) the classification of the sciences in the order of their development, proceeding from the simpler to the more complex—mathematics, astronomy, physics, chemistry, biology, and sociology; and (2) the doctrine of the 'three stages,' or the three aspects in which the human mind successively views the world of phenomena, namely, the theological, the metaphysical, and the scientific. This theory of the three stages, one of the most characteristic of Comte's system, is thus stated by George Henry Lewes:

'Every branch of knowledge passes successively through three stages. 1st, the *supernatural* or fictitious; 2d, the *metaphysical* or abstract; 3d, the *positive* or scientific. The first is the necessary point of departure taken by human intelligence; the second is merely a stage of transition from the supernatural to the positive; and the third is the fixed and definite condition in which knowledge is alone capable of progressive development. In the *supernatural* stage the mind seeks after *causes;* aspires to know the *essences* of things and their modes of operation. It regards all effects as the productions of supernatural agents, whose intervention is the *cause* of all the apparent anomalies and irregularities. Nature is animated by superhuman beings. Every unusual phenomenon is a sign of the pleasure or displeasure of some being adored and propitiated as a God. In the metaphysical stage, which is only a modification of the former, but which is important as a transitional stage, the supernatural agents give place to abstract forces (personified abstractions) supposed to inhere in the various substances, and capable themselves of engendering phenomena. The highest condition of this stage is when all these forces are brought under one general force named nature. In the positive stage the mind, convinced of the futility of all inquiry into causes and essences, applies itself to the observation and classification of laws which regulate effects; that is to say, the invariable relations of succession and similitude which all things bear to each other. The highest condition of this stage would be to be able to represent all phenomena as the various particulars of one general view.'

The religious side of positivism has somewhat the nature of an apology or after-

thought. After doing away with theology and metaphysics, and reposing his system on science or positive knowledge alone, Comte discovered that there was something positive in man's craving for a being to worship. He therefore had recourse to what he calls the cultus of humanity considered as a corporate being in the past, present, and future, which is spoken of as the *Grand Être*. This religion, like other forms of worship, requires for its full development an organized priesthood, temples, &c. Under the régime of positive religion Comte would include the political and social side of his system. Hence some of his followers look forward to the establishment of an international republic, composed of the five great western nations of Europe, destined ultimately to lead the whole world. Society in this great commonwealth will be reorganized on the basis of a double direction or control, that of the temporal or material authority, and that of the spiritual or educating body.

Amongst leading thinkers of the last generation Comte's philosophy found many admirers and some adherents, partly, doubtless, on account of its striking originality, partly by reason of the author's powerful personality. They included such intellects as George Henry Lewes, John Stuart Mill, Richard Congreve, Harriet Martineau, and others. Later investigators, however, have not sustained the favourable verdict of those who judged from a nearer mental perspective. The critiques of Herbert Spencer, Professor Huxley, John Fiske, and Dr. M'Cosh are specially important; also the reply of M. Littré, the foremost French disciple of Comte, to Mill's elaborate critique of positivism. Though there is still a faithful following of the positive philosophy it is not so distinguished as formerly; while the professed disciples of the religion of humanity are few and rare. In London there is a meeting-place of positivists, with Mr. Frederick Harrison as its leading light.

Pos'se Comita'tus, in law, 'the power of the county,' that is, the citizens who are summoned to assist an officer in suppressing a riot or executing any legal process.

Postal Savings Banks. P. M. General Gary in his report strongly recommended the prompt institution of a postal savings bank system, somewhat on the lines of that in operation in Great Britain.

Poste-restante, a department in a post-office where letters so addressed are kept till the owners call for them. It is for the convenience of persons passing through a country or town where they have no fixed residence.

Postern, in fortification, is a small gate usually in the angle of the flank of a bastion, or in that of the curtain, or near the orillon, descending into the ditch.

Post-glacial. See *Post-tertiary.*

Posting, travelling by means of horses hired at different stations on the line of journey, a system established in England as early as the reign of Edward II.

Postmaster-General, the chief officer of the Post-office Department of the executive branch of the government of the United States. His duties are to establish post-offices and appoint postmasters, and, generally, to superintend the business of the department in all the duties assigned to it.

Post-mill, a form of wind-mill so constructed that the whole fabric rests on a vertical axis, and can be turned by means of a lever. See *Windmill.*

Post Mortem ('after death'), a Latin term used as in the phrase *post mortem* examination, an inspection made of a dead body by some competent person in order to ascertain the cause of death.

Post-obit Bond, a bond given for the purpose of securing to a lender a sum of money on the death of some specified individual from whom the borrower has expectations. Such loans are not only generally made at usurious rates of interest, but usually the borrower has to pay a much larger sum than he has received in consideration of the risks the lender runs in the case of the obliger predeceasing the person from whom he has expectation. If, however, there is a gross inadequacy in the proportions amounting to fraud a court of equity will interfere.

Post-office, a department of the government of a country charged with the conveyance of letters, newspapers, parcels, &c., and also since recent times with the transmission of telegrams. From the time of Cyrus the Elder down to the middle ages various rulers had concocted more or less effective systems of postal communication throughout their dominions; but the 'post' as we know it to-day is an institution of very modern growth. The first traces of a postal system in England are observed in the statutes of Edward III., and the post-office as a department of government took its rise in the employment of royal messengers for carrying letters. The first English

postmaster we hear of was Sir Brian Tuke, his date being 1533. In 1543 a post existed by which letters were carried from London to Edinburgh within four days, but this rate of transportation, rapid for that period, lasted but a short time. James I. improved the postal communication with Scotland, and set on foot a system for forwarding letters intended for foreign lands. In 1607 he appointed Lord Stanhope postmaster for England, and in 1619 a separate postmaster for foreign parts. Up to within a short time of the reign of Charles I., merchants, tradesmen, and professional men availed themselves of any means of conveyance that offered, or employed express messengers to carry their correspondence. The universities and principal cities had their own posts. The foreign merchants settled in London continued to send their foreign letters by private means long after the establishment of the foreign post. In 1632 Charles I. forbade letters to be sent out of the kingdom except through the post-office. In 1635 he established a new system of posts for England and Scotland. All private and local posts were abolished, and the income of the post-offices was claimed by the king. Interrupted by the civil wars, peace had no sooner been restored than a more perfect postal system was established. In 1683 a penny post was set up in the metropolis. During the government of William III. acts of parliament were passed which regulated the internal postal system of Scotland; and under Queen Anne, in 1711, the postal system of England was arranged on the method on which, with some modifications, it continued till near the middle of the 19th century. Sir Rowland Hill, the author of the system at present existing, gave the first intimation of his plan in a pamphlet in the year 1837. He soon had the satisfaction of seeing the legislature adopt his plan, in its principal features at least, and on the 10th January, 1840, the uniform rate of 1*d.* per ½ oz. for prepaid letters came into operation. The success of Rowland Hill's scheme was vastly favoured by the invention of the adhesive postage-stamp, the idea of which would seem to be due to Mr. James Chalmers of Dundee. Subsequently many important improvements have been made in the management of the post-office business. One of these was the adoption of postal carriages on railways, by which the delivery of letters was greatly accelerated. These carriages are fitted with an apparatus into which letter-bags are thrown without stopping or even materially slackening the speed of the train; while the sorting of letters, &c., proceeds during the transit. The reduction of the cost of carriage, the great increase in the rapidity of transmission, the immense development of commerce, together with the increase of population, have had the effect of enormously increasing the work done by the post-office. In 1839 the total number of British letters conveyed through the post-office was estimated at about 76,000,000; in 1892 it had reached 1,767,500,000. In the latter year there were also 214,600,000 post-cards forwarded, and 69,685,480 inland telegrams (including press and free telegrams). The post-office revenue fell for a period after 1840; but in 1852 the gross revenue on the new system overtook that which was yielded on the old, and it is still generally increasing. The net revenue for the year ending March 31, 1892, was £3,048,698.

The rates of postage established in 1840 continued in operation till 1871, when the present rate was introduced, namely, for every letter not exceeding 1 oz. 1*d.*; above 1 oz. but not above 2 ozs., 1½*d.*; and ½*d.* additional for every 2 ozs. or fraction of 2 ozs. up to 12 ozs. No letter can be conveyed by post if it is more than 1 foot 6 inches in length, 9 inches in width, and 6 inches in depth, unless it proceeds from, or is sent to, one of the government offices. When special security is required for the delivery of a letter the letter may be registered for a fee of 2*d.* in addition to the postage, the post-office undertaking to give compensation up to a certain extent when it or its contents are lost. The post-office now also certifies the posting of a letter on payment of ½*d.* Any newspaper published at intervals not exceeding seven days, and duly registered, may, subject to certain conditions, be sent by post to any part of the United Kingdom for ½*d.* Packets of newspapers may be made up and sent at the rate of ½*d.* for every 2 ozs. or fraction of the same up to 14 lbs., beyond which no packet can be conveyed. Book-post packets are sent at the same rate, but they must not exceed 5 lbs. in weight nor be more than 18 inches in length, 9 inches in breadth, by 6 inches in depth. Circulars which are wholly or in great part printed or lithographed may be sent by book-post either singly or in packets, and in ordinary book-packets an entry is allowed on the first page of a book stating by whom it has

been sent; but any communication of the nature of a letter found in the packet makes it liable to double letter-postage. Since 1870 post-cards having a halfpenny stamp printed on them have been issued by the postal authorities, as a means of conveying any communication, whether written or printed. Inland post-cards are of two qualities and prices, while reply post-cards are issued at double the rates of the others. There are also foreign post-cards for transmission to the colonies and to all countries in the Postal Union (mentioned below). Since 1883 parcels may be sent by post between any places in the United Kingdom at the following prepaid rates:—not exceeding 1 lb. in weight, 3*d.*; up to 2 lbs. 4½*d.*, to 3 lbs. 7½*d.*, 5 lbs. 9*d.*, 6 lbs. 10½*d.*, 7 lbs. 1*s.*, 11 lbs. 1*s.* 6*d.* No parcel may exceed 11 lbs. in weight, or 3 feet 6 inches in length, or with length and girth combined, more than 6 feet. Postage-stamps may be used for receipts and certain other purposes instead of inland revenue stamps, and also for the payment of inland telegrams.

Other departments under the management of the post-office in Great Britain are the money-order department, the savings-bank department, annuities and life assurance department, and telegraph department. For the savings-bank department see *Banks*, and for the annuities and life assurance department see *Post-office Insurance*. The money-order department was annexed to the post-office in 1838. By means of an inland money-order an amount, not exceeding £10, can be transmitted to any person in any part of the United Kingdom and presented for payment at the post-office named in it within twelve months after the date of issue, otherwise it is legally void. At first the rates were much higher than they are now. The rates now are for sums up to £1, 2*d.*; to £2, 3*d.*; £4, 4*d.*; £7, 5*d.*; £10, 6*d.* A new kind of money-orders came into use in 1881, in the shape of transferable 'postal orders' for fixed sums, forming a kind of small currency. The amounts of and charges on these orders are: 1*s.* and 1*s.* 6*d.*—½*d.*; 2*s.*, 2*s.* 6*d.*, 3*s.*, 3*s.* 6*d.*, 4*s.*, 4*s.* 6*d.*, 5*s.*, 7*s.* 6*d.*, 10*s.*, and 10*s.* 6*d.*—1*d.*; 15*s.* and 20*s.*—1½*d.* Stamps to the amount of 5*d.* may also be affixed to an order to cover any further sum which it is desired to transmit, but the order must be presented for payment within three months of issue, otherwise a new commission will be charged. There are now money-order conventions with most foreign countries and with all the colonies, so that money in this form can be transmitted to most parts of the world. The amount transmitted by inland money-orders and postal orders in 1891–92 exceeded £44,947,300. There are also telegraph money-orders issued between the chief offices of the principal towns of the United Kingdom. The amount so transmitted is limited to £10; the commission charged is double the money-order rates, and the payee must himself attend the office to receive payment.

The telegraph lines of the United Kingdom have been worked by the post-office since 1870. An act passed in 1868 authorized the Postmaster General to buy up all existing lines, to make extensions and improvements as occasion requires, and to work them as part of the post-office business. A second, passed in 1869, practically gave the government a monopoly in telegraphing. The rate is 6*d.* for twelve words or less, and ½*d.* for every word afterwards, the addresses of sender and receiver being both charged for.

In recent years an immense stride has been taken in the improvement of postal communication between different countries by the formation of the International Postal Union in 1885. All the states of the Union form a single postal territory, having a uniform charge for the letters, &c., passing between the several states of which it is composed. The countries included within the Union are divided in the Postal Guide into classes A and B. Under class A, which includes the whole of Europe, Egypt, Canada and the United States, Persia, the rates are, for letters, 2½*d.* per half-ounce; for post-cards, 1*d.*; and for printed matter, ½*d.* per 2 ozs.; while under class B (including the West Indies, Mexico, Central and South America, West Africa, &c.) the rates for letters are 4*d.* per half-ounce; post-cards, 1½*d.*, and printed matter, 1*d.* per 2 ozs. To India, Ceylon, Straits Settlements, &c., though belonging to class B, the charges are, 5*d.* per half-ounce; post-cards, 2*d.*; printed matter, 1½*d.* per 2 ozs. A letter must not exceed 2 feet in length or 1 foot in width, and the fee for registration under both classes is 2*d.* The Australian and South African colonies are outside of the Postal Union.

In France a system of postal messengers for administrative purposes was established under Louis XI. in 1464, and it is to France that the term *post* is due. A general postal

system in France was set on foot in 1576. Up to near the end of the 18th century the French posts were farmed out. The postal reform introduced into England by Sir Rowland Hill was to some extent adopted in France in 1849, but it is only recently that the French postal arrangements have been rendered satisfactory. In regard to cheapness of letter-carriage France, however, is still behind Great Britain. In Germany the first post was established in Tyrol about the latter half of the 15th century by the Count of Thurn, Taxis, and Valsassina, and the administration of the postal system of the empire, with the revenues attached, remained until 1803 as a fief to this family. Many of the German states, however, had also a separate post of their own. The connection of the telegraphic with the postal system of Germany began in 1849. Since the establishment of the German Empire a uniform postal and telegraphic system has been organized for the whole of Germany. The Germans have paid great attention to their postal arrangements, and in some respects they are ahead of other countries. To Germany is due the introduction of post-cards, which were first proposed by Prussia at a postal conference held at Karlsruhe in 1865. The postal system of Italy arose in Piedmont about the year 1560, when the Duke of Savoy farmed out the transmission of letters to a postmaster-general. This arrangement continued until 1697, when Duke Victor Amadeus added the income of the post-office to the revenue of the state, and from 1710 the administration was carried on directly by the state. Since the unification of Italy a reorganized system, including telegraphic and parcel transmissions, has been extended to the whole of the kingdom. In most of the other states of Europe a very perfect system also now obtains. The same is the case with the British colonies and the United States. The earliest mention of a post-office in the British N. American colonies is in 1639, a post-office for foreign letters being then established at Boston. In 1683 a post-office was established in Pennsylvania by William Penn. In 1692 a postmaster-general for the American colonies was appointed, and a general postal system was soon after organized. Benjamin Franklin was postmaster-general in 1753–74, and numerous reforms were instituted under his management. In the United States all mail matter is divided into four classes. The first class includes letters, post-cards, and anything closed against inspection: postage, 2 cents each oz. or additional fraction of an oz.; post-cards, 1 cent; registered letters, 10 cents in addition to postage. Second class matter includes all newspapers, periodicals, &c., issued as frequently as four times a year: postage, one cent per lb. or fraction thereof. When the newspapers, &c., are sent by persons other than the publishers the charge is one cent for each four ounces. Mail matter of the third class includes books, circulars, proof-sheets, &c.: postage, 1 cent for each 2 ozs.; limit of weight, 4 lbs. each package. The fourth class embraces merchandise and all matters not included in the other three classes: postage, 1 cent per oz.; limit of weight, 4 lbs. Prepayment of postage by stamps for all classes of matter is required. In most of the Central and South American states the postal system is as yet far from being well organized, though a somewhat better state of affairs prevails in Chili, Mexico, the Argentine Republic, and Brazil, in each of which there is also a system of state telegraphs. In Asia the postal service is carried on for the most part by agencies of European states. In China a body of couriers exist for conveying government despatches. Japan has of late years developed a postal service modelled on the European systems.

Larceny in relation to the post-office is punished with great severity. Every person employed under the post-office who wrongfully opens or detains a letter, or is accessory thereto, is liable to be punished by fine or imprisonment, or both. If he embezzle, secrete, or destroy a letter, he is guilty of felony, and is liable to penal servitude. Telegraphic despatches are put nearly on the same footing as letters, but articles sent through the book-post are on a somewhat different footing. The best source of information with regard to the British post-office is the British Postal Guide.

Post-office Insurance, a department of the British post-office, the duties of which include the issuing of government annuities as well as of life-assurance policies, first fully organized in 1865. Annuities, either immediate or deferred, to the amount of £50, payable half-yearly, and deferred monthly allowances to the amount of £4, 3*s.* 4*d.*, may be purchased for any person of ten years of age and upwards. Deferred annuities may be purchased either by a single payment or by instalments. By paying

higher premiums the person on whose life the annuity depends may secure the repayment to his representatives of all the premiums paid up to his death, if that event should take place before the annuity becomes due. Policies of insurance for sums not less than £20, nor more than £100, may be issued to any person between the ages of sixteen and sixty, and the premiums may be paid by yearly, half-yearly, quarterly, monthly, or fortnightly instalments, provided no payment be less than 2*s*. Complete tables of the premiums payable in this department may be seen at any local post-office. Consult also the British Postal Guide.

Post-office Savings-banks. See *Bank*.

Post-pleiocene, or POST-PLIOCENE, in geology, same as *Pleistocene*.

Post-tertiary, in geology, the Lyellian term for all deposits and phenomena of more recent date than the Norwich or mammaliferous crag. It may be restricted so as only to include accumulations and deposits formed since the close of the glacial or boulder drift systems, and has been divided into three sections—*historic*, *pre-historic*, and *post-glacial*. The first comprises the peat of Great Britain and Ireland, fens, marshes, river-deposits, lake-silts, accumulations of sand-drift, &c., containing human remains, canoes, metal instruments, remains of domestic animals, &c. The *pre-historic* comprises similar, or nearly similar deposits, but the remains found in them are older, comprising stone implements, pile-dwellings, and extinct animals, as the Irish deer, mammoth, &c. To the *post-glacial* belong raised beaches, with shells of a more boreal character than those of existing seas, the shell-marl under peat, many dales and river valleys, as well as the common brick-clay, &c., covering submarine forests or containing the remains of seals, whales, the mammoth, rhinoceros, urus, hyæna, hippopotamus, &c.

Postulate, a position or supposition assumed without proof, being considered as self-evident, or too plain to require illustration. In geometry, the enunciation of a self-evident problem. Euclid has constructed his elements on the three following postulates: 1. Let it be granted that a straight line may be drawn from any one point to any other point. 2. That a terminated straight line may be produced to any length in a straight line. 3. That a circle may be described from any centre at any distance from that centre.

END OF VOL. VI.